THE PRINTING TRADES
AND THEIR WORKERS

UNIVERSITY
OF FLORIDA
LIBRARY

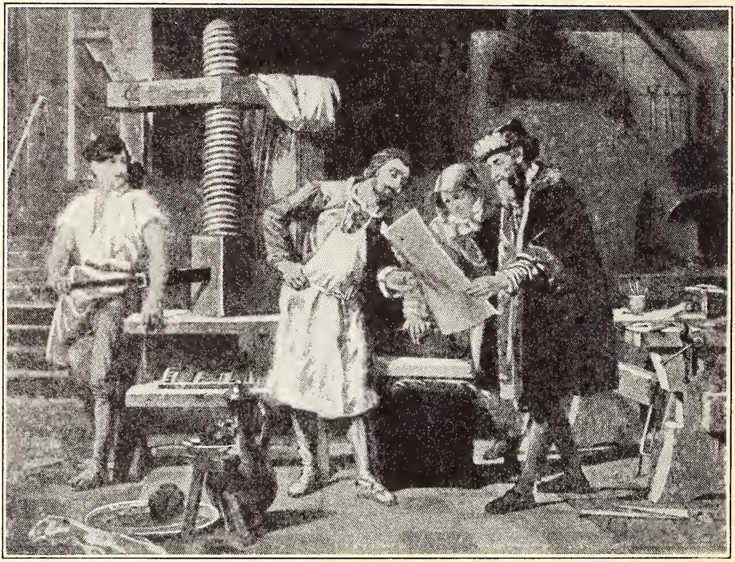
1853

Digitized by the Internet Archive
in 2013

http://archive.org/details/printingtradesth00clar

MODERN SCHOOL SERIES
Frank W. Cyr, *Consulting Editor*

THE PRINTING TRADES AND THEIR WORKERS



Courtesy of American Type Founders Co.

GUTENBERG'S PRINTING PRESS

The Printing Trades
and
Their Workers

by

Florence E. Clark, M. A.
Personnel Director, Farragut High School
Chicago, Illinois

Prepared for

The National Vocational Guidance Association

Occupational Research Section

INTERNATIONAL TEXTBOOK COMPANY
SCRANTON, PENNSYLVANIA
1939

655
C592p

COPYRIGHT, 1939, 1932, BY THE
INTERNATIONAL TEXTBOOK COMPANY
COPYRIGHT IN GREAT BRITAIN

PRINTED IN THE UNITED STATES OF AMERICA

All rights reserved. This book, or parts thereof, may not be reproduced in any form without the permission of the publishers.

SECOND EDITION

INTERNATIONAL TEXTBOOK COMPANY
Scranton, Pennsylvania

80615

Foreword to the Second Edition

In the six years which have passed since the first edition of this monograph appeared, the Occupational Research Section of the National Vocational Guidance Association has seen the realization of the Section's objective in sponsoring its preparation and publication. This monograph has demonstrated that a study, national in scope, has certain distinct merits over the local study. It has become a model for occupational studies and a valuable source of information on the printing industry for counselors and students throughout the country. Reviewers have commented most favorably on its comprehensiveness, its illustrative material, its readable style, its organization, and its authentic information.

The Occupational Research Section recognized when it sponsored this volume that, because of the rapid changes in modern industry, it had also assumed a responsibility for keeping the material up-to-date, were the study to continue to be currently useful. In order to carry out that policy, the present revision has been made.

In revising her book, Miss Clark has made a very complete resurvey of the printing trades. All the census and other statistical data have been checked and made to square with present information; descriptions of new mechanical processes and of other developments of recent years have been incorporated, and changes in selection of workers have been noted. Questions at the end of each chapter and an index have been added, and the bibliography has been enlarged to include all significant literature published since 1932. This new text illustrates the thoroughness of revision that the Occupational Research Section deems essential in order that occupational information may be kept accurate and reliable.

Frances Cummings, President,
National Vocational Guidance Association,

Mary Schauffler, Chairman,
Occupational Research Section.

January 10, 1939.

26 Apr 42 F/A Bk Co Journal/Dm

FOREWORD

This monograph on "The Printing Trades and Their Workers" is the outcome of a plan of the Occupational Research Section of the National Vocational Guidance Association to publish a study, national in scope, demonstrating the technique of the Section and embodying its ideals for research.

The Research Section sponsors a Coordination Plan with nine member organizations, which agree to conform to the standards of the Section in making studies of occupations. A description of this plan, with approved outlines for making studies, can be found in an article by Miss Mary P. Corre in the May 1931 number of the Vocational Guidance Magazine.

Four of the members of the Coordination Plan (the public school guidance bureaus of Chicago, Cincinnati, New Orleans, and Detroit) had published pamphlets on the printing trades, which they agreed might be used as a basis for the present monograph. The author had access also to other research material of value: in particular to a pamphlet on "The Printing Trades" prepared by the Kiwanis Club of New York City, under the direction of the National Junior Personnel Service; to an unpublished study on the printing industry by the Children's Bureau; and to Lane's book, "Occupations in Industry," Vol. III.

Since the studies drawn upon carry references to sources of material they are not repeated here. Additional research, including some establishment visits, was necessary before the manuscript was complete. All material has been rewritten from a new point of view, but with the standard outlines of the Section as a guide.

113674

It is hoped that the study will serve not only as a demonstration of desirable methods of research in occupational literature for juniors, but will also be the first of a series of studies of national scope, helpful to small towns and to cities engaged in guidance activities, which lack research facilities or funds for publication.

GEORGE E. MYERS, *President*
National Vocational Guidance Association

LOIS BENNETT, *Chairman*
Occupational Research Section

February 15, 1932.

TABLE OF CONTENTS

CHAPTER I—A BIRD'S-EYE VIEW OF THE INDUSTRY AS A WHOLE

Page

The Printing Industry Plays an Important Part in Our Lives 1
The Size of the Printing Industry 2
Where the Printing Plants are Located and Their Size...... 3
The Growth and Changes in the Printing Industry 5
The Branches of the Printing Industry and Departments in Printing Plants 6
One Trade Has Become Many Trades 7
Some Questions to Answer and Problems to Solve.......... 10

CHAPTER II—THE COMPOSITOR WHO SETS THE TYPE

The Composing Room 11
Some Early Compositors 13
The Number of Compositors in the United States 14
Workers in the Composing Room 14
    Layout Man or Designer 14
    Copyman or Copy Cutter 15
    Hand Compositor 15
    Linotype Operator 17
    Monotype Keyboard Operator 18
    Monotype Caster Operator 18
    Machine Tender 19
    Teletypesetter Operator 19
    Bankman 19
    Proofreader 19
    Copyholder 19
    Make-up Man 20
    Stoneman 20
Qualifications of the Compositor 21
Some Questions to Answer and Problems to Solve.......... 23

CHAPTER III—THE PRESSMAN WHO PRINTS THE TYPE FORMS PREPARED BY THE COMPOSITOR

The Pressroom 24
Development of the Printing Press 26
Number of Pressmen in the United States 30
Workers in the Pressroom 31
    Platen Presses 32
    Flat-bed Cylinder Presses 32
    Rotary Presses 32
    Pressman 33
    Pressman's Assistant 35
    Press Feeder 35
Qualifications of the Pressman 35
Some Questions to Answer and Problems to Solve.......... 36

CHAPTER IV—THE BOOKBINDER WHO PUTS THE BOOK OR PAMPHLET TOGETHER AND COVERS IT

Page

The Bindery Department 37
Early Binding of Books 39
Number of Bookbinders in the United States 40
Workers in the Bindery Department 41
    Folder 45
    Paster or Tipper 46
    Gatherer 46
    Collator 46
    Stitcher 46
    Smasher or Presser 47
    Trimmer 47
    Rounder 47
    Backer 47
    Liner-up 47
    Gold-Leaf Gilder 47
    Marbler 50
    Caser-Maker 50
    Caser-In 50
    Stamper 50
    Gold Layer 51
    Embosser 51
    Indexer 51
    Mailer 51
    Ruler 53
Qualifications Needed by Bindery Workers 54
Some Questions to Answer and Problems to Solve 55

CHAPTER V—THE STEREOTYPER AND THE ELECTROTYPER WHO DUPLICATE THE TYPE FORMS

The Stereotyping and the Electrotyping Departments 56
Number of Workers in the Occupations 57
Beginnings of Electrotyping and Stereotyping 58
The Workrooms 60
Workers in the Stereotyping Department 61
    Flong Maker 61
    Mat Roller 61
    Steam Table Man 61
    Caster 61
    Trimmer 62
Workers in the Electrotyping Department 63
    Wax Caster 63
    Molder 64
    Builder 65
    Batteryman 65
    Caster 66
    Finisher 67
    Router 67
    Blocker 68
Qualifications Needed by the Stereotyper and the Electrotyper 68
Some Questions to Answer and Problems to Solve 69

CHAPTER VI—THE PHOTO-ENGRAVER AND THE LITHOGRAPHER WHO MAKE CUTS FOR ILLUSTRATIONS

Page
Beginnings and Present-Day Uses of Photo-Engraving and Lithography 70
Number of Photo-Engravers and Lithographers 71
The Workrooms 72
Workers in the Photo-Engraving Department 75
  Operator or Photographer 75
  Stripper 76
  Printer 76
  Tint Layer or Ben Day Artist 77
  Etcher 78
  Router-Blocker 78
  Finisher 79
  Proofer (Prover) 80
Workers in Rotogravure Photo-Engraving 80
Qualifications Needed by the Photo-Engraver 81
Workers in the Lithographing Department 82
  Stone and Plate Preparer or Grainer 83
  Letter Artist 83
  Photo-Lithographer 83
  Lithographic Color-Artist Retoucher (process artist) .. 83
  Press Plate Maker (transferrer) 84
  Crayon Artist or Crayon Lithographer 84
  Stone Engraver 84
  Hand Transferrer 85
  Proofer or Prover 86
  Offset Pressman 86
Qualifications of the Lithographer an dof the Offset Pressman · 87
Some Questions to Answer and Problems to Solve 88

CHAPTER VII—MORE INFORMATION ABOUT THE PRINTING INDUSTRY IN GENERAL

Facts about Men and Women Who Work in Printing Trades 89
  Relative Number of Workers in the Various Printing Trades 89
  Women Workers 91
  Nationality and Race of Workers 92
  Young Workers in the Trades 93
Conditions which Surround the Worker at His Work 94
  Working Conditions 94
  Hours of Work 97
  Regularity of Employment 97
  Wages 99
How Workers and Employers in Printing Trades Co-operate 102
  Employers' Organizations 103
  Employes' Organizations 104
  Extent of Employee Organization 105
  Results of Organization 106
Some Questions to Answer and Problems to Solve 108

CHAPTER VIII—APPRENTICESHIP: HOW YOUNG PEOPLE ARE TRAINED ON THE JOB

Page

Apprenticeship Varies from Shop to Shop and from Trade to Trade 109

How Boys and Girls may find out about Apprenticeship for Themselves 110

Regulations of Apprentices 111
- Limitation of Number of Apprentices 111
- Entrance Requirements 112
- Length of Apprenticeship and Assignment to Duties.. 113
- Additional Training Required 114
- Wages and Hours 114
- Graduation of the Apprentice 115
- Some Questions to Answer and Problems to Solve .. 116

CHAPTER IX—SCHOOLS AND THEIR RELATION TO APPRENTICESHIP

Printing Courses in Regular Schools 118

Vocational Schools 119

Part-Time Trade Schools for those Apprenticed 125

Advanced Courses that Train for the Printing Trades 132

Some Questions to Answers and Problems to Solve 133

TO THE BOYS AND GIRLS WHO HAVE READ THIS BOOK 134

APPENDIX I—Suggestions for Looking up References, Especially those in the Census Volumes 137
- List of References 140

APPENDIX II—List of Employers' Organizations 144
- List of Employees' Organizations 144

APPENDIX III—Questionnaire to be used for Finding out System of Apprenticeship when Visiting a Print Shop 146
- Questionnaire to be used when Interviewing a Union Official and in Reading over the Apprenticeship Agreement for one of the Printing Trades 147

APPENDIX IV—Bibliography 148

INDEX 151

To the Boys and Girls Who Read This Book

Just as the citizen today learns about the life around him, the way in which the city or village furnishes drinking water to the people, protects their buildings from fire, or takes away their garbage; just as the citizen thinks about the uses of churches and museums in a community; so, too, the good citizen must know more and more about the work world (also called the economic world) in which he is living. In order that you may learn about this work world, which you look forward to entering some day, not so far in the future, this book has been prepared.

Each boy and girl will have to make a choice of what he wants to do, train for his chosen occupation, and start working in that occupation. But he is not a worker, all by himself; he becomes a part of that great whole, the work world, through which other members of the community, as well as he himself, are fed, clothed, and have a better life.

This book on the *Printing Trades and Their Workers* describes only a small section of the whole world of work, but a very important section. Some of you will find help in making a choice of what you want to do; others of you, perhaps, who already have decided on the printing trade as your future occupation, will learn more about it. All of you will learn how workers in distant places, in small towns and in large ones, in small quiet workrooms or in large humming establishments, are helping to make the books, pamphlets, and newspapers which carry ideas to you and to the whole world.

CHAPTER I

A Bird's-Eye View of the Industry as a Whole

The Printing Industry Plays an Important Part in Our Lives

The printing industry has become such a necessary part of our daily life that we can scarcely picture what we would do without it. It is the printing industry that gives us the newspapers that are on our doorsteps in the morning or at night, the magazines that come through the mail each week or each month, the books that we read, some of the pictures that we enjoy, the sheets of music used by the musicians. Not only does the printing industry furnish us with reading material that makes our lives more interesting and more enjoyable, but it also furnishes the establishments in other industries with articles with which they can carry on their work. The bookkeeping forms, the bill forms, tags on which prices of dresses and suits are marked, the headings on letters and envelopes, notices about sales, advertising posters, are only some of the many helps that the printing industry gives to other businesses.

In furnishing so many books, magazines, and newspapers, the printing industry plays a very important part in the spreading of ideas. The railroad train or boat carries people and manufactured goods from one place to another. The printing industry, when it makes a book, puts the ideas and thoughts of the author in such form that they can be carried not only to the smallest village but to the furthermost parts of the world, and not only to people today but to the people who will live in the future.

If we think back to the time when we had no books, we can see what this means. Then, if a man had an idea, it might be carved in stone on an Egyptian tomb or on the walls of a national university as they did centuries ago in China. Only persons who lived near those places could see what had been written. Somewhat later, when monks in the monasteries copied books by hand and illustrated them beautifully in colors, there were a few more books, but only for the noblemen and clergymen to use. The masses of the people still had to get their news and their ideas by word of mouth from other people whom they chanced to meet.

From the 15th century until the present time there have been a series of inventions; the printing press, movable type, the application of steam power, more inventions of still more complicated machines, until today we have the modern printing plant. As a result all boys and girls, even if they have not the money to buy the books and newspapers, can, through the public libraries, read about what has happened in the past and what is happening today in Europe, China, or at the North or the South Pole. They do not have to wait until the traveler returns to tell them about it. They can read what several people say about the country and begin to judge for themselves which is the correct report. Thus in a brief time an idea may go around the world and through the printed page, produced by the workers in the printing industry, practically the whole world will know about it.

The Size of the Printing Industry

We have said that the printing industry is important because it is a necessary part of our daily life. There is another way to show how important an industry is, and that is to hunt up facts and figures about that industry and to compare it with other industries. No person is educated today unless he is able to understand more or less how to use these facts and figures, which we call statistics. Boys and girls are able to learn how to use these statistics as well as adults.*

---

*The small number following a word refers to a note, to be found in Appendix I, which begins with page 140. These notes give the book and page where the original facts and figures can be found. Some of the older boys and girls may wish to look up these references.

The census[1] of the United States gives the best information about the occupations of the workers in the United States, as well as the size and the value of an industry. This census[2] tells us that the printing industry is a major industry. When number of workers is taken as a measure of importance, the printing and publishing industry concerned with newspapers and periodicals ranks fifteenth; and the printing and publishing industry concerned with books, music, and job work ranks seventeenth in a list of 111 industries whose ranks are given. Some of the industries heading the list and outstripping each of the two branches of printing and publishing just mentioned are cotton goods, steel works and rolling-mill products, railroad repair shops, boots and shoes other than rubber, bread and baking products, and silk and rayon. When the value of the product is taken as a measure of importance, the newspaper and periodical publishing industry ranks fifth and when the value added by manufacturing is considered, it ranks first. The book, music, and job branch of the publishing industry ranks sixteenth when the value of the product is considered and seventh when the value added to manufacture is used as a measure of importance. When all branches are added together, the printing industry is listed as the sixth ranking industry in the United States.

According to the biennial census of 1935[3] the figures show that in the United States there were 22,606 printing establishments, in which 475,123 persons were employed. This number includes office and other salaried employees, besides the 304,842 men and women wage earners employed directly in or in connection with the printing trades themselves.

Where the Printing Plants are Located and their Size

These printing establishments are scattered all over the United States and are not merely found in a few of the larger cities as are so many other industries. Not every small town or village has a print shop but many of them do. There is scarcely a boy or a girl who has not seen a printing shop where one man works, with the front of the shop used for meeting the customers, with the window displaying samples of programs, letterheads, or calling cards he has printed, and with the back of the shop reserved for the cases of type and printing presses where the work is actually done.

In 1929 the latest census for which we have these particular figures,[4] 814 book and job establishments out of 12,712 had no workers other than the owner. In the newspaper and periodical branch of the industry for the same year, 2,582 establishments out of 11,524 were run by the owner with no employees. In all branches of the industry, 18,167 establishments out of 27,400 or over sixty-five per cent had five wage earners or less. In three branches of the industry, book and job, music, newspaper and periodical, only 10 establishments had over one thousand employees each. Obviously the industry is characterized by the large proportion of very small shops.

On the other hand, while the industry has so large a proportion of small shops, still all the small shops taken together produce only a small proportion of the finished product measured in dollars. An economist, who has made a special study of the printing industry, reports that there is a striking tendency for most of the book and job printing to be done in the largest establishments.[5] This is confirmed by later figures of 1929.[6] These show that whereas the smaller establishments of from $5,000 to $20,000 evaluation, represent 47.2 per cent of the number of establishments, they produce only 6.4 per cent of the product measured in dollars. In contrast to this, establishments, valued at $1,000,000 or over represent but 1.1 per cent of the number of establishments and produce 27.3 per cent of the product. In 1925 this group of establishments produced 24.1 per cent of the product; and in 1919, only 18.4 per cent. These statistics show that more and more work is being done in the largest establishments.

Although printing shops are scattered all over the United States yet there are two large centers, one in New York, the other in Chicago. Together they produce over fifty per cent of the book and job output and almost a third of the newspaper output, both measured in dollars.[7] Other important centers are the industrial areas of Philadelphia, Detroit, Los Angeles, St. Louis, San Francisco-Oakland, Cleveland, Cincinnati, and Minneapolis-St. Paul.

The Growth and Changes in the Printing Industry

When one is studying an industry either from the point of view of its importance in the community or from the point of view of considering it as a possible future occupation for oneself, a very necessary fact to consider is whether the industry is growing or decreasing and whether, therefore, it needs more or fewer workers.

TABLE 1[8]

Growth and Changes in the Printing Industry As Shown in All Branches, from 1899 to 1935

Census Year	No. of Establishments	Average No. of Wage Earners	Value of Products in Dollars	Value Added by Manufacture in Dollars
1899	23,814	195,260	395,186,629	291,532,345
1909	31,445	258,434	737,876,087	536,101,497
1919	32,476	287,278	1,699,789,229	1,128,278,952
1929	27,400	356,204	3,155,827,543	2,393,971,457
1931	24,789	315,306	2,487,824,784	1,909,744,486
1933	19,293	262,993	1,726,425,370	1,350,582,768
1935	22,606	304,842	2,164,995,207	1,552,819,152

The census helps us by furnishing facts about the industry for several decades back, facts about the number of establishments, the number of wage earners, the value of the product, and the value added to the raw materials brought into the printing establishment and changed into books, newspapers, and periodicals, all of which tell us whether an industry is growing or decreasing.

Table I shows a number of important things about the printing industry: the number of establishments in certain years from 1899 until 1935; the average number of wage earners (not the salaried workers); the value of the products in dollars; and the value added to the raw materials by the workers, also computed in dollars. Tracing down column one and two, we find that the number of establishments increased up until 1919, then declined until 1933, and rose slightly in 1935 to a total still below the number which existed in 1899. The number of workers increased until 1929, then declined during the depression years of 1929 to 1933 and increased in 1935 to a total not so high as existed in 1931. In 1935 the date for which we have the latest figures, the 304,842 wage earners were housed in 22,606 establishments whereas, in 1899, 195,260 wage earners were housed in 23,814 establishments.

The value of the products of the printing industry reached its highest point in 1929, namely $3,155,827,543. During the depression years it declined and by 1935 again it had made considerable gains.

What the future years will show it is difficult to tell. If no serious general depression occurs one would expect the printing industry to grow as it did prior to 1929 and to regain its position of that year. Whether the number of workers will increase correspondingly or whether improved methods of management and production will bring the same output with fewer workers, it is difficult to say.

Branches of the Printing Industry and Departments in Printing Plants

In our discussion we have already seen that the printing industry produces several very different kinds of printed material, and because of the different products the industry is divided into several branches. These divisions are generally known[9] as (1) printing and publishing, book, music, and job; (2) printing and publishing, newspaper and periodical; (3) bookbinding and blankbook making; (4) engraving (other than steel, copperplate, or wood), chasing, etching, and diesinking; (5) engraving, steel, copperplate, and wood, and plate printing; (6) lithographing; (7) photo-engraving; (8) stereotyping and electrotyping. Several of the branches are not so well known as the first two.

If one were to visit an establishment representing each of the eight branches of the printing industry, one might find a total of six different departments. These are the composing, the press, the binding, the stereotyping, the electrotyping, and the photo-engraving departments. All six would rarely be found in any one establishment. Another interesting fact that we would observe is that a department such as that of photo-engraving in the newspaper branch of the industry might be as large or larger than the whole establishment producing only photo-engraving and classed in the photo-engraving branch of the industry. A large printing establishment, doing book and job work, will have the following departments—composition, presswork, and bookbinding. A printing establishment, publishing a newspaper, will have a composing, a presswork, a stereotyping, and a photo-engraving department.

It is into each of these departments in turn that we shall go, one after another, to see what the various workers are doing. But we shall want to remember that although each worker is doing but a small part in the manufacture of the finished book or newspaper, yet each has an important and necessary part in sending the book or newspaper out to be read by the various people in the community.

One Trade Has Become Many Trades

As we go into each department in turn, one thing that will impress us, is the number of skilled trades in the printing industry. Back in the early 15th century when movable type and the printing press were invented, people spoke of the "printer." Since that time invention after invention has been made, which has so changed the making of books and newspapers that we no longer talk about the printer but we talk about the compositor, the pressman, the bindery worker, the stereotyper and electrotyper, the photo-engraver, and the lithographer. And, as we go to see each of these workers in the various departments of a large establishment in turn, we shall be further surprised, for instead of the compositor we shall find several different men or women at work, each doing a part of the composing; instead of the pressman, several men doing presswork; and instead of a bindery worker, many different bindery workers, each doing his particular task or working at his own machine. Instead of the all-round printer, who worked as recently as a century ago, we today have over fifty skilled men and women, each called by a name describing the particular part of the trade he is performing, yet each and all truly "printers."

This is what is known as division of labor. It has come about through the development of machinery and the application of power such as steam or electricity to run the machines. As more and more complicated machines continue to be invented, we may expect to find the trades of today broken up still further, or changed, or entirely new ones created.

While in the large establishments the one trade has become many trades, we must not forget that all the establishments are not large and that more than sixty-five per cent of the establishments have five employees or less. In the smaller shop, where there are fewer machines, the work of the compositor and pressman is still done by one man. Instead of ten or fifteen different kinds of bindery workers there may be only one or two.

There are many more interesting facts to be told about the industry as a whole, such as the way in which boys and girls learn the trade, the hours of work, the seasons, the wages paid, and the regulations made by the workers and the employers in the industry. These facts and others we shall talk about later, after we have gone into the various departments and have seen the compositor, the pressman, the bindery worker, the electrotyper, the stereotyper, the photo-engraver, and the lithographer at their daily work.

A NEWSPAPER COMPOSING ROOM

Reprinted from "The Printing Industry" by courtesy of the Vocation Bureau, Cincinnati Public Schools

Some Questions to Answer and Problems to Solve

Chapter I

1. We say the printing industry is an important industry. Through what two ways can we show that it is important?
2. What industries surpass the printing industry in importance when we consider the number of workers employed? What other measure, besides number of workers employed, might be used to compare the relative importance of industries?
3. What is our best source of information about occupations of workers in the United States? Write a short paragraph about this source.
4. (a) List the name and address of a small print shop that you know. Is any one beside the owner at work in it? How much space does the shop cover?
   (b) Give the name and address of the largest printing plant you know. How much space does it cover? How many stories high is it? Estimate the number of workers.
5. Of what importance is it to a worker to know that the printing industry consists of many one-man shops?
6. List the two largest centers of the printing trade; also five other large centers. How do you account for their location?
7. Is the printing industry increasing in importance when (a) the number of establishments is considered; (b) the number of workers; (c) the value of the product?
8. Draw a rough graph showing the trends in the industry when the number of workers is considered.
9. List the eight branches of the industry and attempt to list opposite each, the name and address of an establishment in that particular branch.
10. What is meant by division of labor? Write a short paragraph illustrating how division of labor occurs in the printing industry.

CHAPTER II

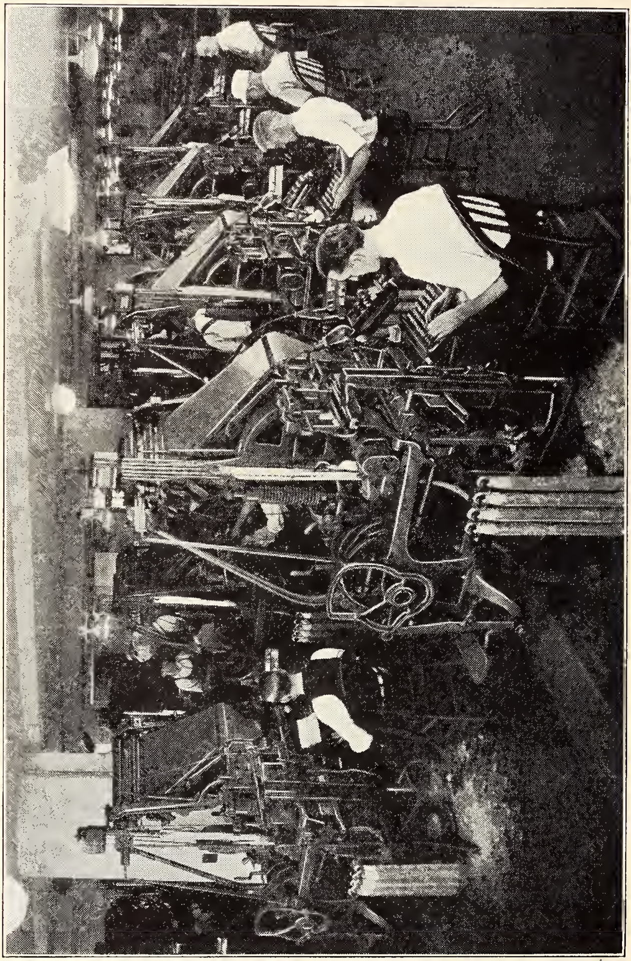
The Compositor Who Sets the Type

The Composing Room

It is in the composing room that the book, newspaper, letterhead, or pamphlet is set up in type form. The material comes to the composing room, sometimes written in longhand, sometimes perfectly typewritten. In some instances, when a customer wants only a small order of business paper printed with a letterhead, he may not have his material written down, but will talk it over with the owner of the shop, who may also be the compositor. In printing establishments where large orders are filled, from the time the copy to be printed is received, through to the time when it is in type form, ready to go to the pressroom, or to the stereotyping or electrotyping department, various men and women in the composing room have worked upon it.

The composing room may be only the back part of a shop, in the front of which is the place where the compositor meets his customers and where samples of paper, or of former work, are displayed. The composing room in a large publishing house or newspaper plant, on the other hand, may be a series of large rooms, some with rows of cases of type in front of which compositors stand, setting type by hand, others with "batteries" of linotype or monotype machines, at which operators are seated, striking the keys on the keyboard.

The composing room of a modern plant is generally well-lighted, large, and spacious. Although the hand composing room is busy, it is usually quiet. The machine composing room, however, is somewhat noisy, due to the operation of the linotype and other machines. In some very old plants where modern methods of cleaning and ventilation are not used, there



Courtesy of Chicago Daily News

LINOTYPE OPERATORS IN A NEWSPAPER PLANT

may still be some lead dust from the type cases and scraps of lead from the linotype machines; fumes from the lead melted in the linotype and monotype-casting machines; carbon monoxide from gas burners used under the melting pots. But in the modern plant, equipped with the proper exhaust fans and pipes and cleaned by the newest methods, dusts, fumes, and odors have been reduced to a minimum.

Courtesy of Keystone View Company, Meadville, Pa.

THE HAND COMPOSITOR

Some Early Compositors

Before we see what each man and woman in the large modern composing room does today, it will be well to remind ourselves of the beginnings of type making and the use of type in printing. People are not certain who was the discoverer of movable type. Some claim the honor for Coster of Haarlem, Holland, who, while walking one day, cut letters from the bark of a beech tree to amuse his grandchildren. These letters he put together into lines by stringing them on a cord. By others, Johann Gutenberg of Germany is honored as having invented movable type and used it on the printing press.

Setting type by hand continued until the 20th century, when the linotype and monotype machines were invented. It was only recently, in 1928, when the latest and most complicated of the machines, the teletypesetter, was made practical, by means of which type is set with the aid of the telegraph.

Number of Compositors in the United States

Before we look at each man and woman in the composing room to see what he or she is doing, it will be well for us to find out how many such men and women there are in the United States according to the census of 1930, and how widely scattered they are throughout the United States.

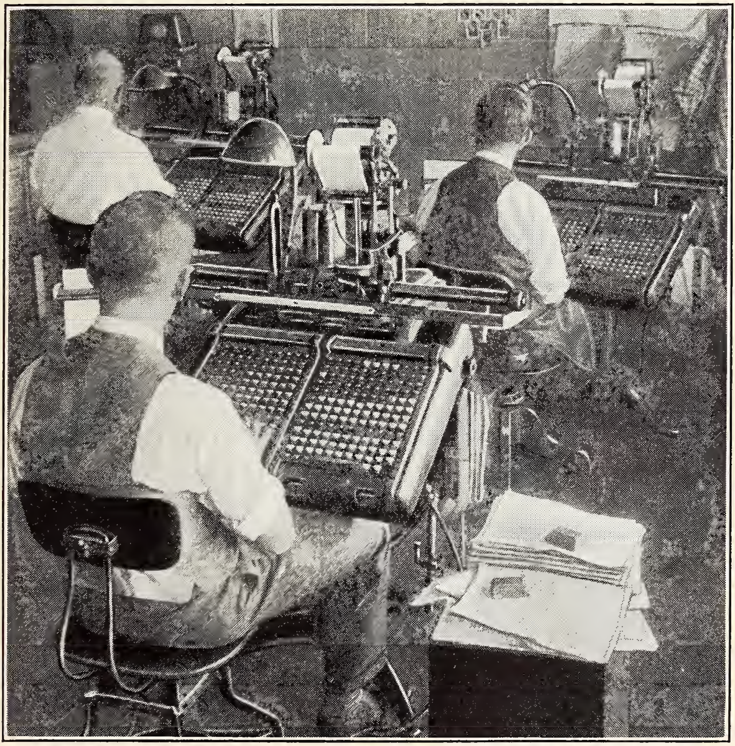
The figures from the census[10] tells us that in 1930 there were 183,632 compositors, linotypers and typesetters, of whom 173,363 were men and 10,269 were women. Generally, more than 200 compositors were to be found in each of the 93 large cities of the country and over 50 were to be found in each of the 283 smaller cities. New York and Chicago, the two large printing centers, had 25,306 and 13,077 compositors, respectively.

Workers in the Composing Room

In looking at the various workers in the composing room, we shall describe the work of each as it is done in the larger printing establishments. But we must not forget that the work is not divided up in such great detail in the smaller establishments and that one person may combine several jobs.

When the manuscript or copy comes into the composing room of an establishment, doing book or job work, it is given to the *layout man* or *designer*, whose duty it is to make a rough sketch of the completed job. He decides on the size and style of type, the quality of paper, and where pictures, ornaments, or borders are to be used. He decides also which portion of the manuscript is to be set up by the hand compositors and that which is to be set by the machine operators. In the smaller shops this work of the layout man may be done by one of the hand compositors.

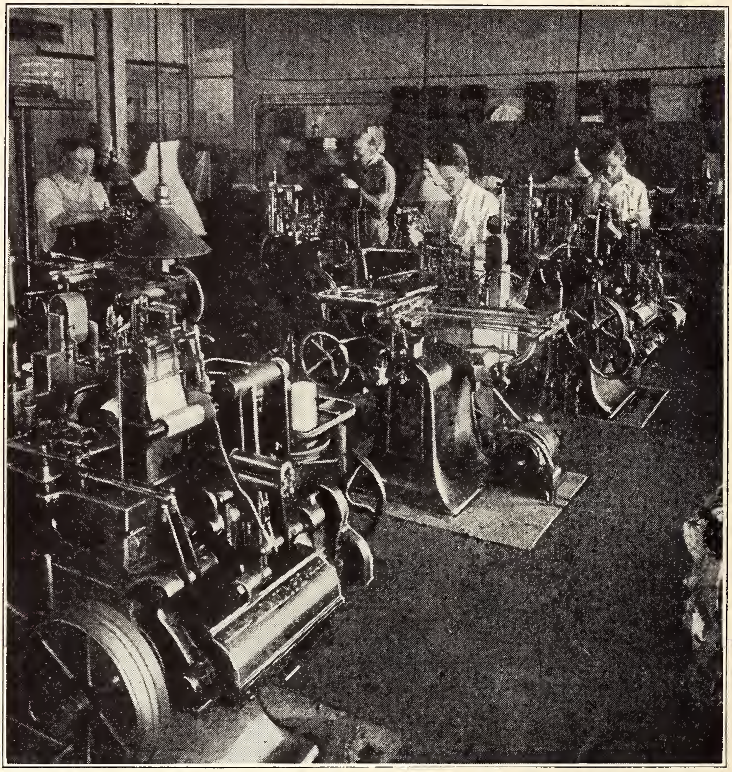
In establishments which publish newspapers, the work of distributing the copy or manuscript to the various typesetters, as it comes from the editorial room, is done by the *copyman* or *copy cutter*.



Courtesy of Keystone View Company, Meadville, Pa.

MONOTYPE KEYBOARD OPERATORS

The *hand compositor* can easily be picked out in the composing room, for he generally stands in front of a high, sloping table or desk, the top of which is a divided tray containing the various types. This is called the case. On top of it he places

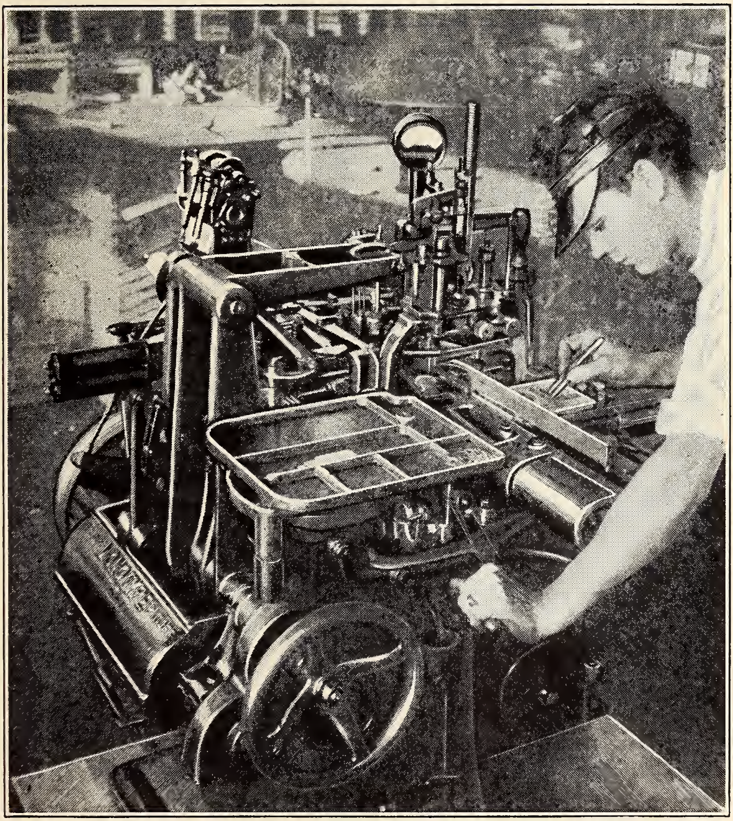


Courtesy of Keystone View Company, Meadville, Pa.

MONOTYPE CASTER OPERATORS

the manuscript or copy which he is to set in type. The compositor holds in his left hand a small container, set the width of the line desired and known as the composing stick. He selects from the case in front of him the necessary letters and spaces, or quads, used to separate the words. These he places in the stick with his right hand and holds them gently in place by the thumb of the left hand which follows the line as it is being set. After the stick is filled he empties it on a galley. This he does by placing first a lead or rule in the front and back of the stick. Then grasping the type with both hands and placing the thumbs at the top of the type with the first fingers at the bottom, the compositor lifts the type very carefully from the stick and places it on the galley. This he continues to do, making one line after another, until he has finished setting up the manuscript, which has been given him.

The *linotype operator* also can easily be identified, for he sits in front of a fairly large machine, which has a keyboard containing some ninety keys and which has overhead, at one side, a sloping part called the magazine. As he strikes a key, a character or matrix is released, which slides into an assembler, the length of the line desired. When a line of matrices has been set, it is released from the assembler line by the oper-



Courtesy of Keystone View Company, Meadville, Pa.

A NEAR VIEW OF THE MONOTYPE CASTING MACHINE

ator, and it then travels automatically to the casting device in the machine, where molten metal is forced against the matrices. Thus a solid line of type or slug is formed. The slug after being cast is trimmed and delivered from the mold into a stick attached to the machine. When this stick is filled, the operator empties it on the galley. In some establishments the operator cleans, adjusts, and repairs his own machine. In others he does not.

At a smaller machine with some two hundred keys the *monotype keyboard operator* is seated. This machine works on an entirely different principle. As the operator strikes the keys, holes are made in a strip of paper in certain locations, the resulting roll of paper looking very much like a narrow, perforated roll, such as is used on a player piano. This operator, too, just as in the case of the linotype operator, sometimes adjusts and repairs his machine.

The perforated roll of paper is removed from the monotype machine and is placed by the *monotype caster operator* in another machine, where compressed air passes through the holes, causing the matrix to be set in position, the type to be

Courtesy of Keystone View Company, Meadville, Pa.

COPYHOLDERS READING TO THE PROOFREADERS

cast, automatically arranged in lines, and delivered on the galley in one operation.

In some large shops there is a special *machine tender* who adjusts and replaces parts of the various typesetting machines.

In some newspaper shops, as we mentioned a few moments ago, a still more complicated machine is used by a man called the *teletypesetter operator.* By touching his keyboard, he is able not only to reproduce the manuscript on a narrow ribbon tape on his own machine, but also, by means of telegraph, to send the same impulses to distant points in the same city or to other cities. There, as well as in the shop where the operator is working, the ribbon rolls are typed and fed into a typecaster machine as soon as they are made.

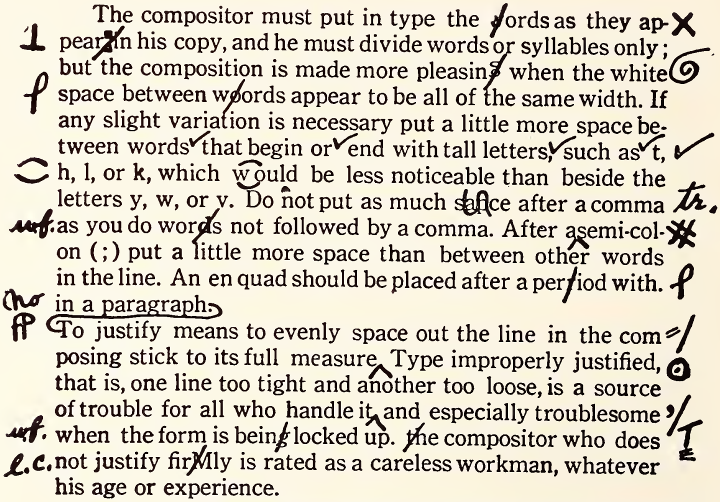
X	Change bad letter	(:)	Colon	no ¶	No paragraph
⊥	Push down space	;/	Semi-colon	wf.	Wrong font letter
9	Turn over	∨'	Apostrophe	stet.	Let it stand
ℓ	Take out [*dele*]	∨''	Quotation	tr.	Transpose
^	Left out insert	=/	Hyphen	Caps.	Capitals
✓	Space evenly	///	Straighten lines	S.C.	Small capitals
#	Insert space	[	Move over	l.c.	Lower-case letter
‿	Less space	□	Em quad space	Ital.	Italic
⁀‿	Close up entirely	⊢1⊣	One-em dash	Rom.	Roman letter
⊙	Period	⊢2⊣	Two-em dash	(?)	Verify
,/	Comma	¶	Make paragraph	○	Spell out

Courtesy of International Correspondence Schools, Scranton, Pa.

ONE STANDARD FORM OF PROOFREADER'S MARKS AND THEIR MEANING

Whether the type is placed in the galley by the hand compositor or by one or all of the machine operators, it comes finally to the *bankman* who works at a table or counter. He puts the galleys in their proper order and numbers them. He then requests the proof-press operator to strike off a proof from the proof press or does it himself.

At this point two other workers come in to assist, the *proofreader* and the *copyholder.* These are sometimes women. The proofreader holds the proof, while the copyholder reads from the original manuscript to him. The proofreader watches for errors of every sort, the kind of type used, spacing, spelling, and punctuation. When he finds an error, he makes a certain sign in the margin, using one of the standard forms of proofreader's marks, the meaning of which everyone in the composing room knows, to show the change that should be made.



The compositor must put in type the words as they ap-
pear in his copy, and he must divide words or syllables only;
but the composition is made more pleasing when the white
space between woords appear to be all of the same width. If
any slight variation is necessary put a little more space be-
tween words that begin or end with tall letters, such as t,
h, l, or k, which would be less noticeable than beside the
letters y, w, or v. Do not put as much sapce after a comma
as you do words not followed by a comma. After asemi-col-
on (;) put a little more space than between other words
in the line. An en quad should be placed after a period with.
in a paragraph.
To justify means to evenly space out the line in the com
posing stick to its full measure Type improperly justified,
that is, one line too tight and aother too loose, is a source
of trouble for all who handle it and especially troublesome
when the form is being locked up. the compositor who does
not justify firMly is rated as a careless workman, whatever
his age or experience.

Courtesy of International Correspondence Schools, Scranton, Pa.

PROOF MARKED BY THE PROOFREADER

After the errors are corrected, sometimes by the bankman, sometimes by the compositor who sets the type, the *make-up man* divides the type matter into pages, inserts the cuts or illustrations, puts in the running titles at the tops of the pages, and the notes at the bottom, and then ties up the pages.

The *stoneman* next places the pages of type matter and illustrations on a large, smooth surface, either stone or metal, called the imposing stone. He places around the pages an iron frame called the chase and in the spaces around the pages he puts in wood or metal blocks called furniture. He next levels the type down with a planer and a mallet and locks the completed form. The type form is ready to go to the pressroom, or to the electrotyping or stereotyping department.

Frequently an additional page proof is made, read by the proofreader and corrected, before the form leaves the composing room.

Qualifications of Compositors

From a careful study of the kind of work which the men and women in the composing room are required to do, one can learn considerable about the knowledge and the qualifications each must have. Somewhat later we shall see how and where the workers can obtain the knowledge and skill necessary to be good compositors.*

In some shops considerable artistic ability in the way of design and color is required of the compositor because he is responsible for the appearance of the printed page. He should have a special knowledge of the English language and of its grammar. If he works in a shop where a foreign newspaper is

---

*See Chapter VIII, Apprenticeship: How Young People Are Trained on the Job, page 109.

Courtesy of Keystone View Company, Meadville, Pa.

THE STONEMAN LOCKING THE FORM

printed, he should have not only a knowledge of the English language but of the foreign language as well. Since the compositor must space the material, he should have a knowledge of arithmetic. If the compositor is also the owner, he should have ability and knowledge to manage his business.

He should be in good general health, since the work is done within doors. He should have good eyesight, since he is constantly using his eyes; and manual dexterity, since he uses his fingers in setting type and striking the keyboard.

In addition to the qualities which are required of all workers, honesty, initiative, industry, dependability, and ability to work with others, the compositor should be accurate and neat and possess an unusual amount of patience. Since the compositor in the one-man shop also does the presswork he may, at times, be required to have those qualities considered necessary to the pressman.*

Some few establishments and some schools give standarized tests in an attempt to measure the various qualifications apprentices and young students should have to become successful journeymen. At the present time the concensus seems to be that each individual test can not be relied upon alone but all available tests used with school records, personal interviews, and home visits, help the person selecting the apprentices to decide which young persons will profit most from training and which are apt to become the successful adult workers.

It is generally agreed that the compositor should have average or more than average general intelligence as measured by a good general intelligence test. To measure manual dexterity sometimes form-board tests, requiring the use of tweezers or the placing of small pegs or pins in holes, are used. Artistic ability may be measured by one of the art tests or judged by a practical test in which the applicant is required to draw some object or copy some picture. Personality and attitudes, which some employers believe are the most important factors in producing superior workmen, are revealed in interviews and home visits. Sometimes personality tests are given.

---

*See page 35.

Some Questions to Answer and Problems to Solve

Chapter II

1. What two men are believed to have invented movable type? Why are we not certain one of them did it? Are we certain today of the man who invented the airplane? Why do we not *know* who did it?

2. Write a short biography about one of the men who is said to have invented movable type.

3. What particular work is done in the composing room? In what form does the material come into the room and in what form does it leave it?

4. List all the workers employed in a composing room. Go through all the illustrations in the book and after each worker listed, place the number of the page on which some illustration of this particular worker is to be found.

5. The census for 1930 shows that there were 183,632 compositors, linotypers, and typesetters of whom 173,363 were men and 10,269 were women. What per cent were men and what per cent were women?

6. Invite the person who reads proof for your school paper into your class and ask him to give you a few minutes talk on either
   (a) Marks that are used to correct proof, or
   (b) Some problems involved in reading proof.

7. Make a list of all the new words of a technical or trade nature which are used in this chapter and write opposite each its meaning, using your own words and not those of the book.

8. List at least five qualifications a compositor should have. What person would you advise against becoming a compositor? Why?

9. What hazards or dangers may occur to a worker in a composing room?

10. List all the equipment and machines that one might find in a large print shop.

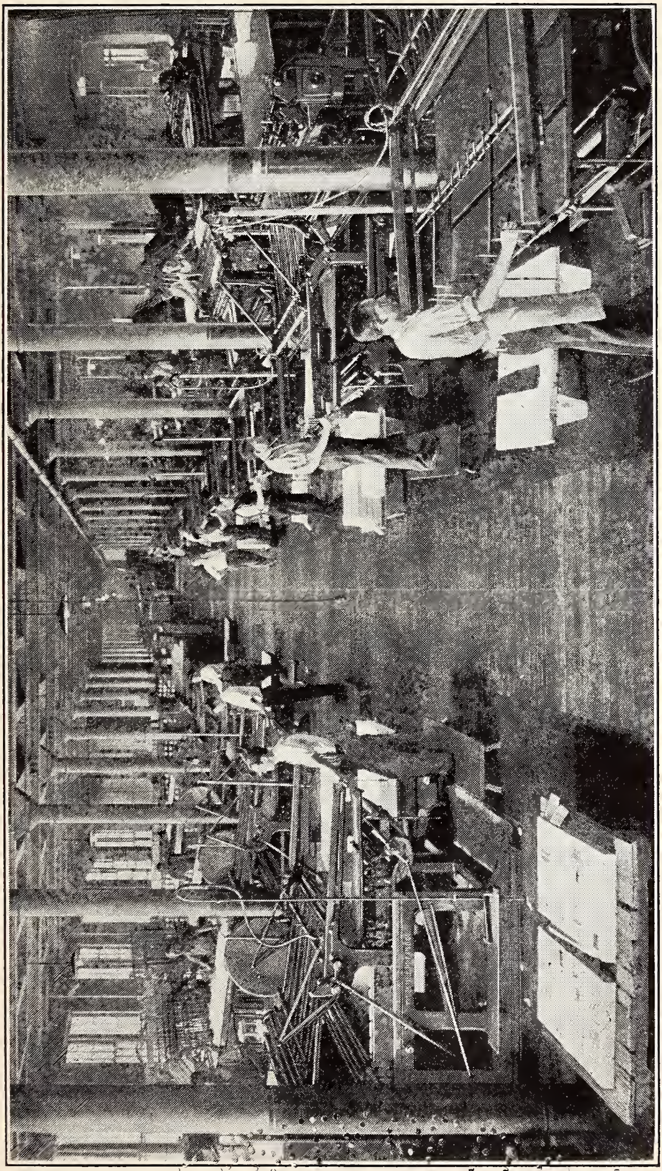
CHAPTER III

The Pressman Who Prints the Type Forms Prepared by the Compositor

The Pressroom

From the composing room the type forms may go directly to the pressroom. In many plants publishing books or newspapers, it is necessary to produce more than one of the same type form from which to print. When this is necessary, the type form is sent into the stereotyping or electrotyping department before coming into the pressroom. When the plates come from the stereotyping or electrotyping department, they may be in curved form to fit the rollers on the cylinder presses. Somewhat later we shall go into the stereotyping and electrotyping departments in order to see the men at work, but at this point all we need to know is that many plates may arrive from these departments, some in the new curved form.

We must also pause for a moment to notice that there are also plates to be printed, containing illustrations only. These, too, come from other special departments or special printing firms, into which we have not yet gone. Into the photo-engraving and lithographing departments we shall go at a later time to see the workers making these plates. However they are made and whatever forms they are in, the plates all have to be put on a press of some sort, and the required number of copies printed from them. From the time the forms or plates come into the pressroom from the composing room, stereotyping, electrotyping or other department, until the type or illustrations are transferred in the particular color and to the particular kind of paper, the pressman and his assistants have been at work.



Courtesy of International Textbook Co., Scranton, Pa.

THE PRESSROOM

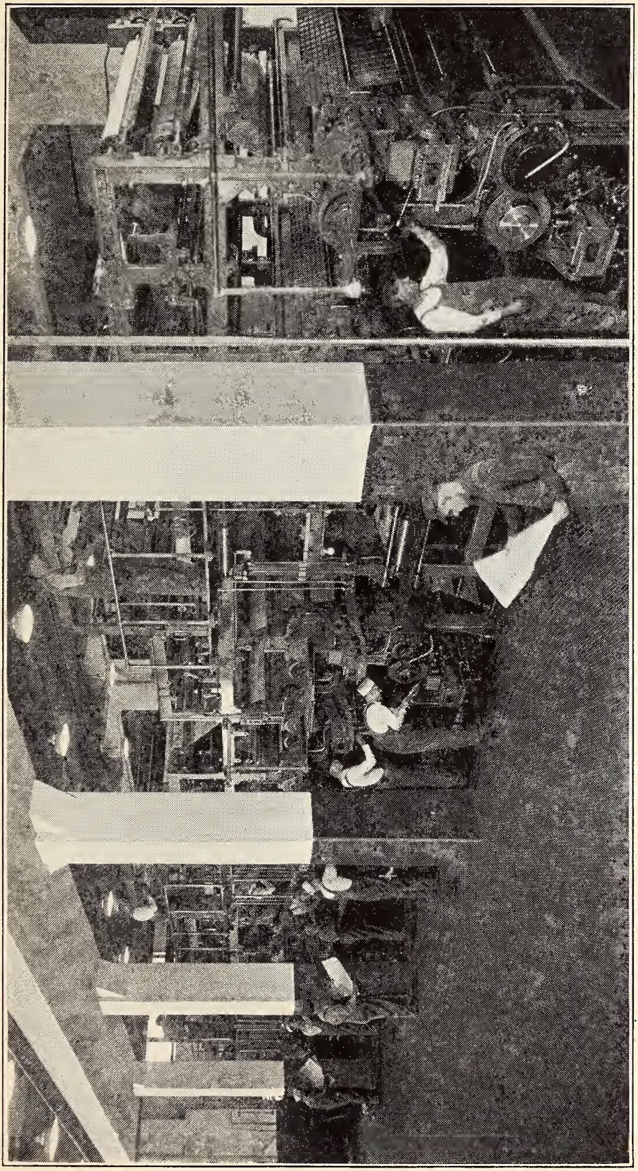
Just as there are very small composing rooms with only one man, or a series of larger composing rooms, with many workers, so we find the pressrooms varying in size. One or two small presses may be found in the back room of a one-man job printing establishment. In a large establishment which prints books or newspapers, or in a photo-engraving or lithographing establishment which prints illustrations, we may find several pressrooms, with different kinds of presses.

The modern pressroom in a large plant is a busy, noisy place when the presses are at work, so noisy that one cannot always carry on a connected conversation with one's guide. Floors and walls vibrate. When there are several departments in an establishment, the placing of the pressroom must be done with care so that the heavy presses will be properly supported and will not disturb the other workers. The inks and the chemicals used in cleaning the various presses give off considerable odor at times. Some pressrooms, too, are kept at an even, warm temperature since it is believed by some that the ink flows more readily and evenly under these conditions. In the very modern plants, however, where the very latest methods of cleaning and ventilation are installed, while the odors and warmth may not always be pleasant or comfortable, there is no exceptional danger to the health of the workers.

Development of the Printing Press

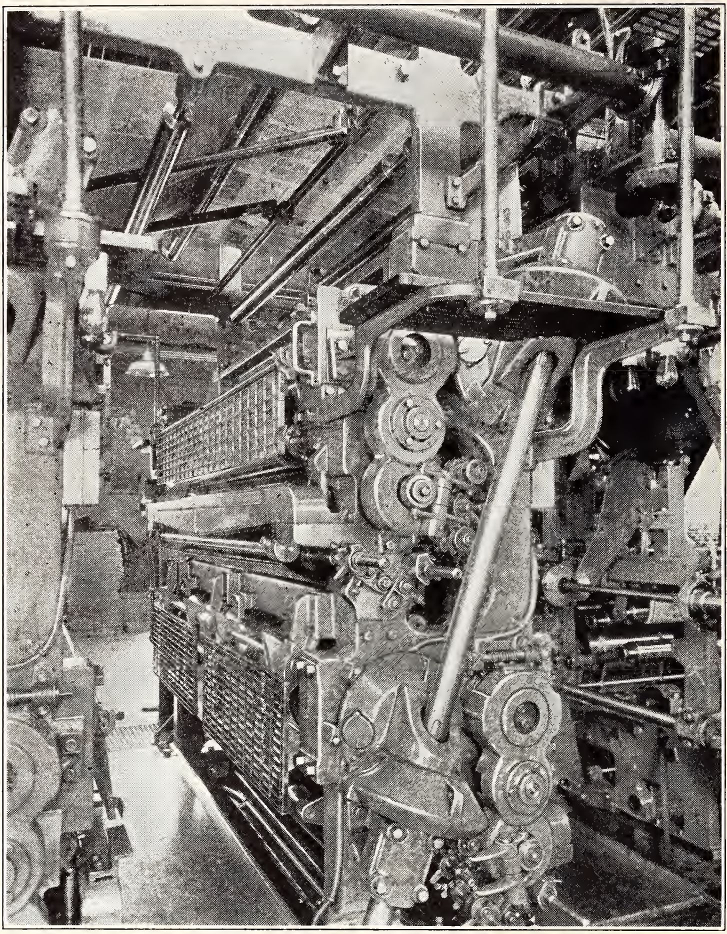
Before we examine the various kinds of presses in the modern pressroom, it will be well for us to think back to the time of the first printing presses. The Chinese, who invented a device centuries ago for reproducing writing, inked the wooden block on which the letters had been cut, placed the paper upon it, and then tapped the surface until an impression was made upon the paper. Boys and girls, who have reproduced designs in their art classes by the wood block-printing method, have used this same process.

About 1450 Johann Gutenberg of Germany, the man who, as some people believe, invented movable type, used a press built of wood quite like an old-fashioned wine press. The



Courtesy of Chicago Daily News

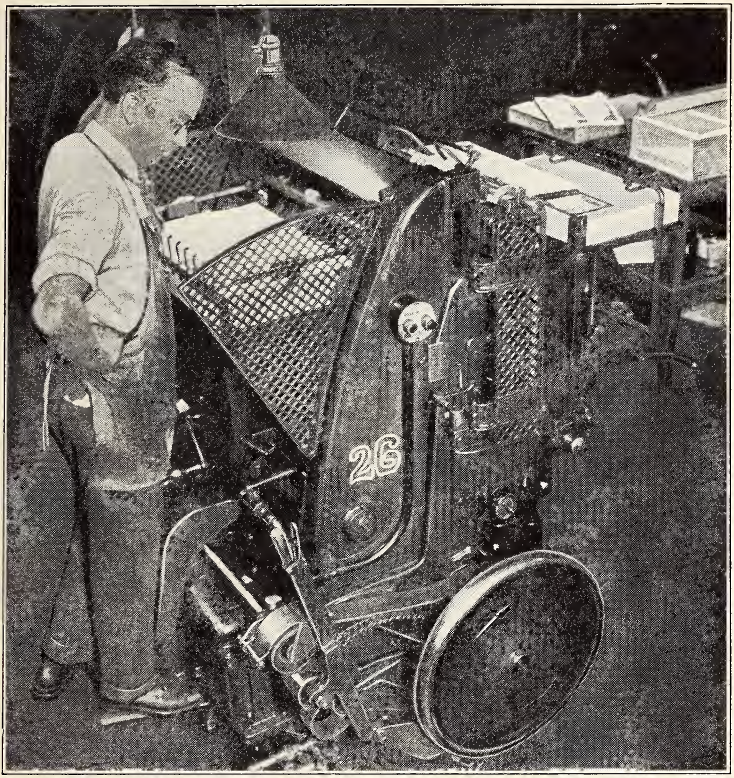
WEB-ROTARY PRESS USED IN A NEWSPAPER PLANT



Courtesy of Chicago Daily News

A CLOSE VIEW OF A SECTION OF THE WEB-ROTARY PRESS

type to be printed was put in position on the lower flat surface and inked. The paper was placed on top and by means of a hand screw the top flat surface was pressed down upon it, thus producing the impression. For a period of from three to five hundred years this general method of printing was used. Toward the beginning of the 19th century, power was applied to the printing press and shortly new types of machines were



Courtesy of Keystone View Company, Meadville, Pa.

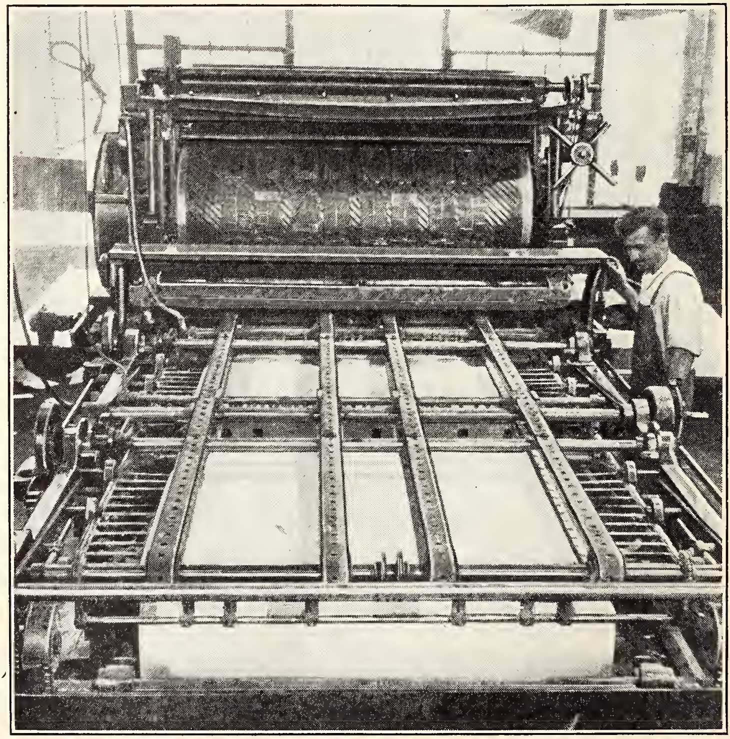
PRESSMAN ATTENDING AN AUTOMATIC JOB PRESS

invented, one of which had a flat bed and a cylinder roll, which presses the paper upon the flat surface to obtain the impression.

From then on the printing press has continued to become an increasingly larger and more magnificent machine. Today we have the huge rotary presses, one of which is the web-rotary press in the newspaper branch of the industry. Not only has this press two cylinders, carrying the curved plates, which print newspapers on both sides at once, but it also cuts, folds, pastes, and counts the newspapers, ready to be sent to the mailing department. New developments in presses and photography make it possible now to print colored portions along with the black and white sections in the regular editions of the daily newspapers. So large have some of the presses become that ladders are attached for men to climb up to a platform or balcony where they can control the machine and watch to see that everything is working smoothly.

Number of Pressmen in the United States

Before we see what the workers in the modern pressroom do, it will interest us to learn how many such workers there are in the United States. Again we go to the census of the United States[10] and find that in 1930 there were 31,215 male pressmen and plate printers. No women were listed as press-

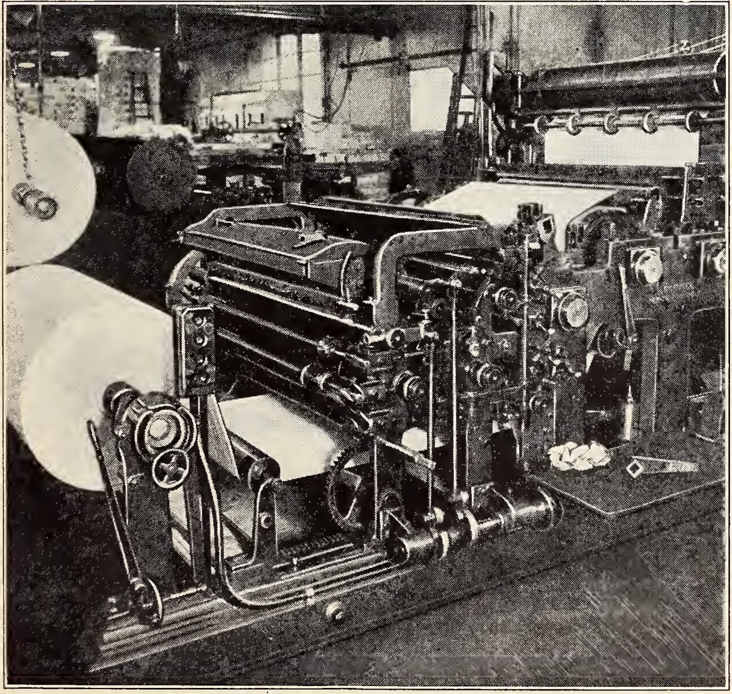


Courtesy of Keystone View Company, Meadville, Pa.

PRESSMAN OPERATING A ROTARY PRESS. THE CYLINDER IS SHOWN CARRYING THE PLATE TO BE PRINTED. THE PAPER IS FED IN FLAT men but women do semi-skilled work as helpers or assistants in some pressrooms; a considerable number of them feed job presses. New York and Chicago ranked first and second, of course, with 3,659 pressmen and plate printers for New York and 3,322 for Chicago. Philadelphia came next with 907. Three cities which had over six hundred pressmen each were Washington, D. C., with 673; St. Louis, with 662; and Los Angeles, with 605.

Workers in the Pressroom

It is not difficult to remember the names of the workers in the pressroom, for there are only three—*pressmen, assistants,* and *press feeders.* The various kinds of presses are more difficult to understand, however. The work of the pressmen and



Courtesy of Keystone View Company, Meadville, Pa.

A ROTARY PRESS FED FROM ROLLS OF PAPER

the assistant varies greatly with the kind of press which they operate. We shall, therefore, look first at the various kinds of presses in use and later at the kind of work the pressman does.

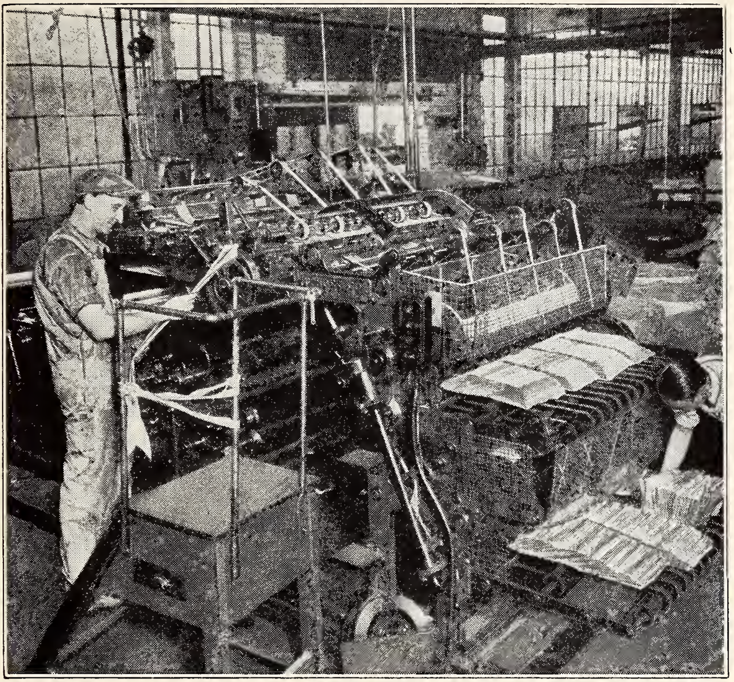
PLATEN PRESSES are more nearly like the original printing press than any of the other modern presses. Practically all platen presses today, however, are power driven and not hand operated. One flat surface carries the type form; another flat surface, called the platen, presses the paper on to the type form. The size and shape of these presses vary. Some are fed by hand; others are automatically fed. This type of press is generally used for job work, where the quantity needed of any one kind of product is not very great. They are to be found in the one-man job shops or in job departments of larger establishments. A form of platen press is usually furnished boys in the school print shop.

FLAT-BED CYLINDER PRESSES have a flat bed which carries the type forms and an impression cylinder instead of the flat impression surface of the platen press. They are used frequently in job shops. A special kind of flat-bed cylinder press is used by lithographing firms. The plate in this case is a stone prepared by the lithographer or engraver by means of chemicals or by etching. Water and ink rollers pass over the stone in such a way that the design is left dry so as to absorb the ink and thus transfer the design to the paper. Another type of flat-bed cylinder press is that used in printing engraved cards. The engraved steel or copper plate, prepared by the engraver or etcher, is placed on the flat bed and a hand-operated lever or wheel causes the impression cylinder to revolve over the plate.

ROTARY PRESSES have two cylinders instead of two flat surfaces as the platen presses, one carrying the plate (curved) to be printed, the other causing the impression to be made. Rotary presses also are of varying makes and sizes. One of the largest is that of the web-rotary, used in newspaper establishments. Here the paper is fed in to the press on a roll, both cylinders on some of these presses carrying plates to be printed. This machine we talked about a short time ago when we were tracing the development of the printing press.

The offset press is another type of rotary press, used in lithographing establishments. The plates, etched by the lithographer, are made of zinc or aluminum. The impression, instead of being transferred directly on to the paper, is transferred first to an endless rubber blanket, rolling upon a cylinder. This, in turn, transfers it to the paper.

The rotogravure press is still another type of rotary press. The cylinders used on these presses have been made in the photo-engraving department and have been etched below the printing surface instead of being in relief. A particular feature of this press is the "ductor" or "doctor" blade or knife, which scrapes off from the flat surface of the plate the surplus ink, leaving it only in the depressions.



Courtesy of Keystone View Company, Meadville, Pa.

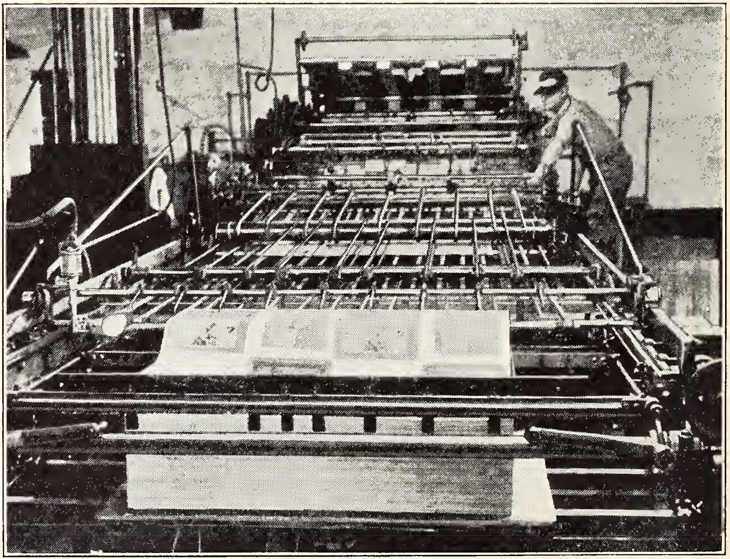
PRESSMAN AT DELIVERY END OF ROTARY PRESS. THE PAPER PRINTED ON BOTH SIDES HAS BEEN CUT IN FOUR STRIPS, FOLDED TO BE USED FOR BOOKS

The *pressman* is responsible for turning out the printed page or illustrations, perfect in every particular. The written matter and illustrations must be properly spaced on the page, and the ink must be so evenly distributed that all parts are equally dark or light. In the case of colored illustrations the proper series of colors must be used and distributed to get the final general effect desired by the artist. In the early days of printing it was thought that any one could run the press; the compositor might stop a few minutes to do it or the errand boy might be called in to assist. Because of the very complicated machines today the pressman is a very skilled workman, trained over many years.

The pressman gets from the foreman of the pressroom the type forms or plates which are to be printed, and with them the instructions as to quality of paper to be used and the kind of ink. He then sets to work, placing the type forms or the curved plates on the press, filling the ink fountains with the proper ink, setting the roller which regulates the supply, placing the guides to obtain the proper margins, and putting the supply of paper on the machine. He takes a proof to see how the ink is distributed and marks on the proof those parts which are lighter or darker than they should be.

He then proceeds to the "make ready," one of the most difficult parts of the job he is required to perform, the purpose of which is to make it possible for the proper amount of pressure to be exerted on each part of the printing surface. By various devices, including the placing of bits of tissue and other paper either beneath the plates or in the packing of the cylinder, he underlays or overlays those parts that need to be brought to the proper height.

After the make-ready is finally prepared, the pressman sees that the press is started, keeping general supervision



Courtesy of Keystone View Company, Meadville, Pa.

PRESSMAN OPERATING A CYLINDER PRESS WHICH PRODUCES COLOR WORK to see that every part is working properly and that the atmospheric conditions are right so that the ink will print evenly. The pressman is responsible also for the oiling, cleaning, and repairing, at least the minor repairing, of his machines.

The *pressman's assistant* helps the pressman as he may direct, bringing supplies to him, assisting with the make-ready, and watching the press feed if it is an automatic one, or feeding the paper into the press himself if it is not automatic. The assistants on the web-rotary press are usually assigned special positions and given special duties. They are sometimes known as the first assistant, located on the brake side of the press; the second assistant or tension man; the third assistant or oiler.

In some shops the man who assists the pressman may merely feed the press, bringing the paper to the press, feeding it in a sheet at a time or watching to see that it does not catch if the press is automatically fed. When his duties are thus simplified, he is called a *press feeder*.

Qualifications of the Pressman

The pressman, in charge of the large presses, has a responsible position; he is in charge not only of very expensive machinery but supervises a number of assistants. He, therefore, must have considerable executive ability, be level headed, able to direct men and meet emergencies. He must have mechanical ability and skill to work with the machines, and some artistic sense for the blending of colors and inks. In the make-ready work he is required to use his hands and fingers with great delicacy and skill. In addition he should have great strength of body and nerve, for heavy piles and rolls of paper must be handled and the whir and jar of the machines are wearing. He should have good eyesight to detect the faintest flaws in the work; he should not be color blind because he must mix colors correctly and detect slight variations in color. He should have good hearing also to discover whether the machines are working perfectly.

Tests to measure qualifications are sometimes given the pressman apprentices as they are given to the compositor apprentices. To ascertain his mechanical ability, the young person is sometimes given a test of mechanical ability, which requires the use of a form board or pencil and paper. Sometimes also a practical test is given, involving the observation and description of machines. Frequently tests for color blindness are given. Interest and ability in chemistry can be measured to some extent by the quality of work done in the chemistry course in high school.

The pressman's assistant needs practically every quality that the pressman has except his executive ability, for he may be told to do any part of the work. The press feeder, whose duties are simpler than those of the assistant, needs nimble fingers to feed the press and ability to follow directions accurately.

Some Questions to Answer and Problems to Solve

Chapter III

1. In what form does the material come into the press room and in what form does it leave the room?
2. Name the men and women who work in the press room.
3. Make a list of all the kinds of presses and opposite each place the page where an illustration of this type of press appears in this book. Study the entire book in this connection.
4. Describe the work done by the pressman in the "make ready". What is the purpose of his doing this?
5. List five qualifications that a pressman should have to be a successful worker.
6. What is color blindness? Why should not a person who is color blind become a pressman if he expects to be the pressman in charge of the presses?
7. Are there any particular hazards to the worker in the pressroom? If so, explain.
8. Visit your school print shop. What kind of press is used? Who is the manufacturer? Is there a guard on the press to protect the student? If so, how does it work?
9. According to the 1930 census where were the largest number of pressmen to be found?
10. Make a list of all the new technical words that you have found in this chapter and after each place its meaning, using your own words and not those of the book.

CHAPTER IV

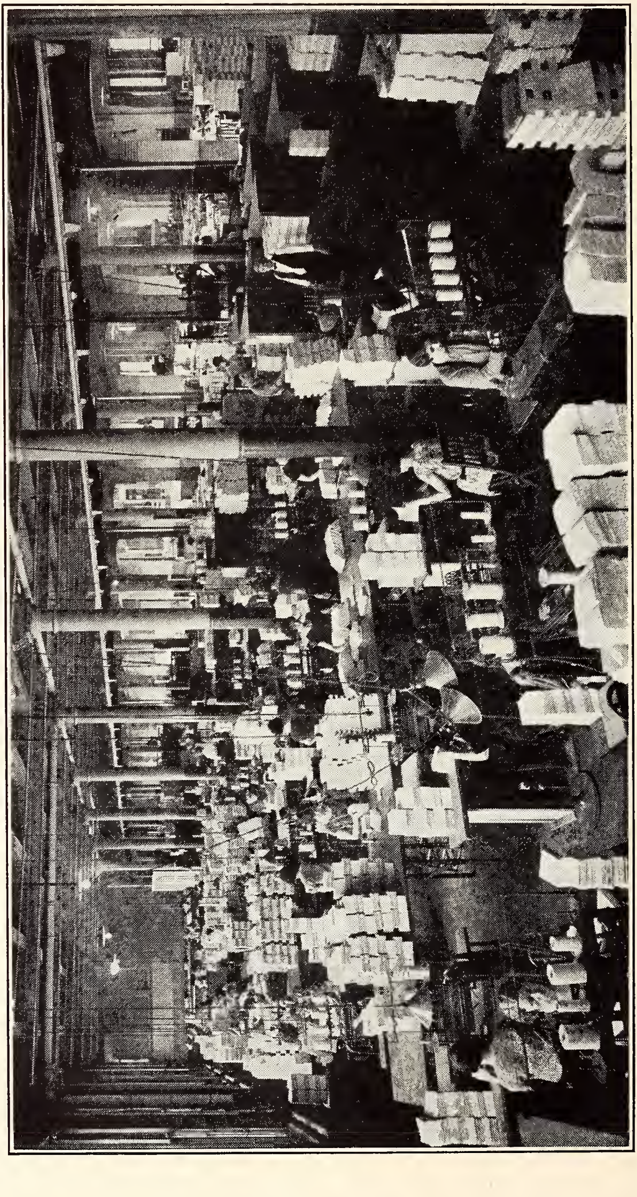
The Bookbinder Who Puts the Book or Pamphlet Together and Covers It

The Bindery Department

All products of printing establishments do not need to be bound. Letterheads, envelopes, tags, and advertising sheets are finished when they come from the pressroom. They never see the bindery department at all. Newspapers, too, are not bound but folded. The mailing department is a very important feature, however, of some large city newspaper establishments, especially when the papers are sent to many surrounding smaller towns and villages over a wide area. Through custom, the workers in these mailing departments are classed as mailers and are under the jurisdiction of the compositors' union although those in binderies are generally classed as bindery workers.

Some of the products of a small job shop may be put together with staples or sewed very simply, for example, small programs, booklets, pamphlets, or calendars. Although the work of putting together is very slight, it is classed as bindery work. The bindery work on magazines and pamphlets, on the other hand, is much more elaborate, and that on books most elaborate of all. The printed material and illustrations come to the bindery room from the pressroom in large flat sheets and go out to the bookseller or to readers from the bindery department in orderly, neat, compact, attractive books and magazines.

Some articles are made in a bindery which have never been to a composing or pressroom. These are the blankbooks and notebooks which we have all used. In the bindery blank paper is ruled in various ways and bound in different kinds of covers.



Courtesy of International Textbook Co., Scranton, Pa.

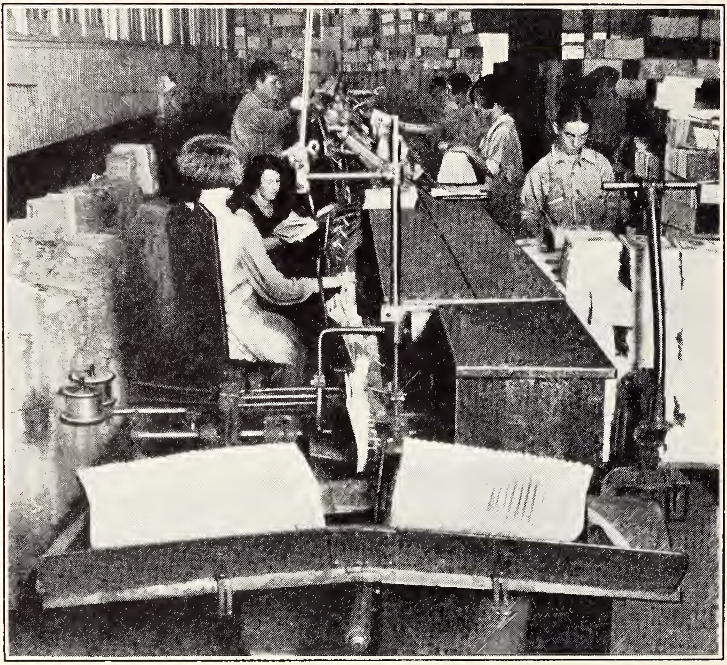
A SECTION OF A BINDERY

Binderies are generally divided into three kinds, according to the nature of their product, pamphlet binding (classified as "soft"), bookbinding (known as "hard"), and paper ruling. Just as we have seen in our study of the composing and the pressroom, that the size of the rooms or departments varies, so we find bindery departments of various sizes. A one-man shop really has a miniature bindery department in that part of the shop where the stapling machine is kept and where the programs are put together. On the other hand, the bindery department of a large publishing house may consist of many rooms, in each of which a particular part of the bindery work is done. Some of the houses have, besides the rooms where the covers are made and the books bound by machine, a separate room where old craftsmen make, by hand, beautifully decorated books bound in leather.

The bindery department in a modern plant is an interesting and attractive place. Huge piles of blank or printed sheets of paper are to be seen on one hand, and on the other pile after pile of books, neatly wrapped in their covers awaiting delivery to the dealers. Modern binderies are generally light and spacious with very little odor except, perhaps, from the glue. Most of the machines do not make excessive noise. The exception to this statement is in the case of those machines, used in binding books, which press or smash the parts together, and which stamp the letters on the covers. In some large binderies, where the work is very much subdivided, there is frequently much hurry, drive, and tension in the speeding up of the work.

Early Binding of Books

Before we look more closely at the work the bindery workers do, it is well to remind ourselves that even before books were written, tablets were preserved and papyrus was rolled about a rod and called a scroll. In the 4th century, long before the printing press and movable type were invented, the book as we know it today began to take "leaf" form. The pages were hand written and the binding consisted of vellum or calfskin. During the middle ages the monks in the monasteries spent



Courtesy of Keystone View Company, Meadville, Pa.

A TEAM OF WORKERS WHO GATHER, COLLATE, AND STITCH WITH THE HELP OF A MACHINE

hours in decorating the margins of the pages and in tooling the leather with beautiful designs, even setting jewels at times in the covers. It was not until the early part of the 19th century that cloth was used for binding books. As has been suggested, there still remains here and there in this country, in the midst of the machine industry, an occasional craftsman who binds books by hand, sewing the signatures together and making beautifully tooled and decorated leather covers.

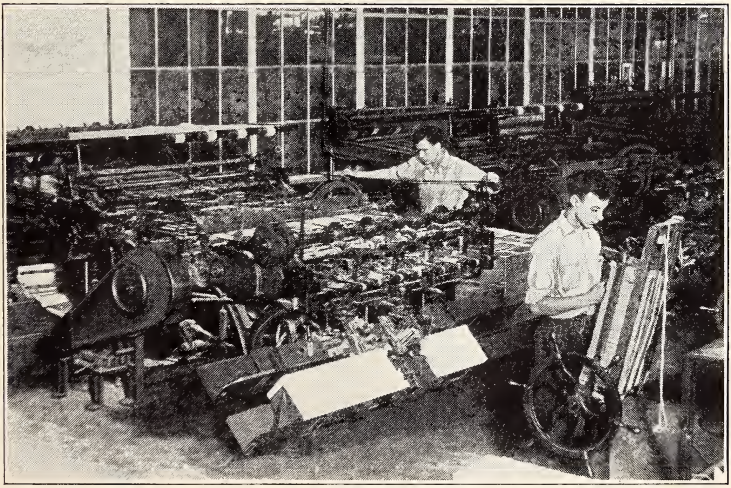
Number of Bookbinders in the United States

The census does not list the bookbinders separately as it does the compositors and pressmen, and some other workers in the printing trades. We, therefore, are not able to tell exactly how many bookbinders there are in the United States.

Perhaps the census does not list them separately because so large a portion of them are not highly skilled, and therefore classes them as semi-skilled workers. The census[10] counts these semi-skilled operatives as well as laborers, giving a total of 81,693 for the printing industry. This does not help us much because other semi-skilled operatives besides bookbinders are listed in this total. From the census of manufactures,[11] which is taken more frequently than the regular census, we find figures that help us. These show us that in 1935 there were 1,022 separate bindery establishments with 20,454 wage earners. The census of manufactures does not show us, however, the number of bindery departments in other printing establishments nor the additional numbers of bookbinders to be found in them.

Workers in the Bindery Department

When we visited the composing room, we found the work of the compositor divided into a number of skilled trades. When we visit the bookbinding department, we find the work very much more divided and, as a result, some of the

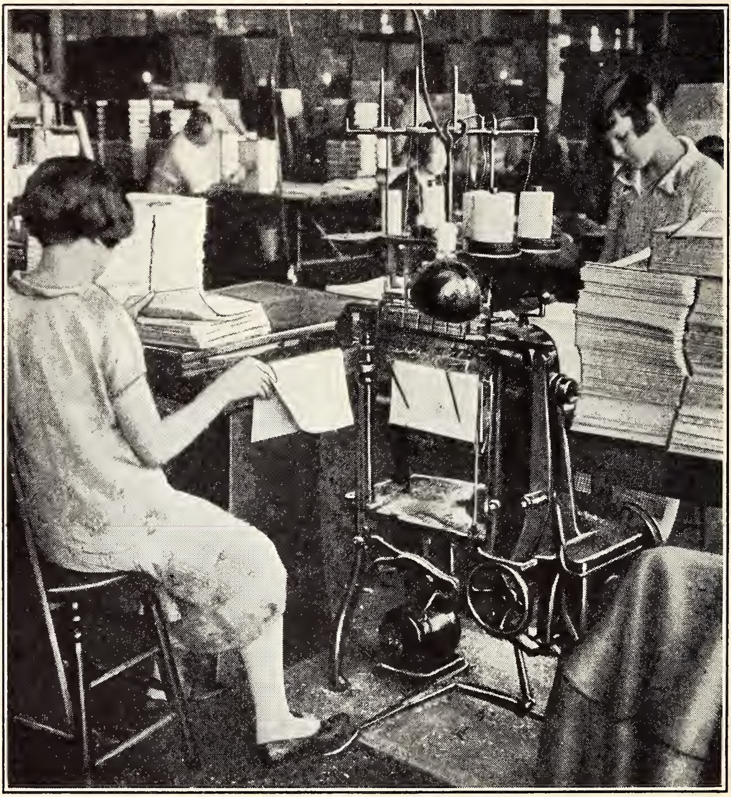


Courtesy of Keystone View Company, Meadville, Pa.

FOLDING MACHINE OPERATOR

occupations more nearly resemble factory work than skilled trades. As we saw a few minutes ago, the census classes the bindery workers as semi-skilled workers. As we observe the different kinds of work the bookbindery workers do, we shall want to remember that one man or one woman may do several or all kinds of work, or, in other establishments may, day in and day out, perform but one operation.

Machines of various kinds have been invented and are still being invented to do practically all the different kinds of work in the bindery department. All establishments do not have



Courtesy of Keystone View Company, Meadville, Pa.

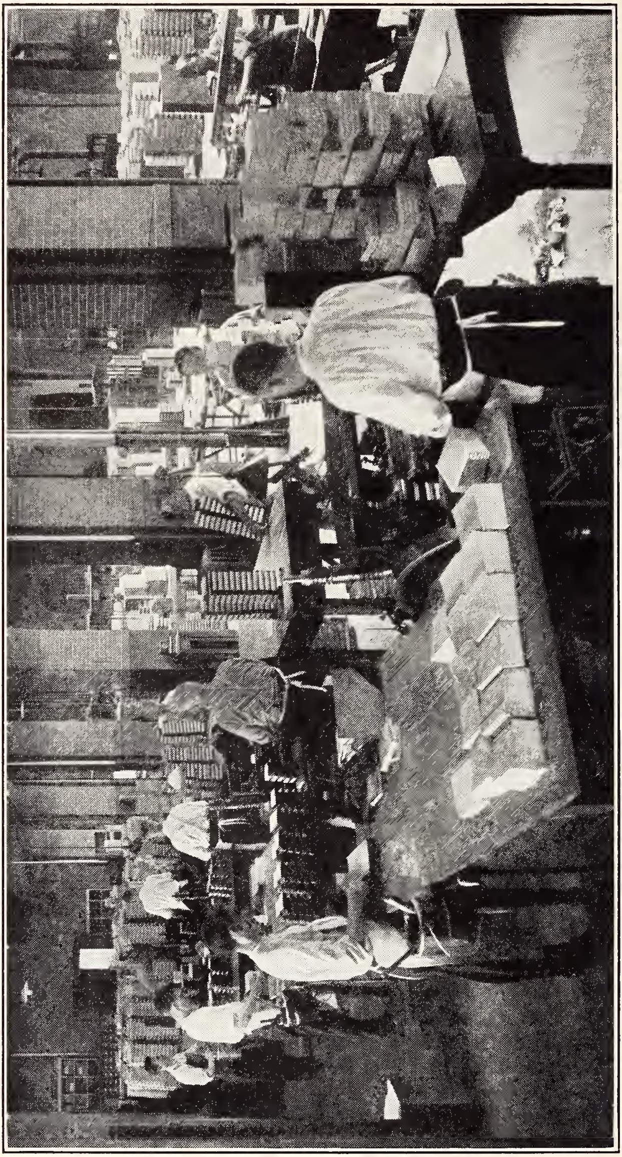
A STITCHER WHO IS SEWING SEPARATELY THE SIGNATURES FOR A BOOK

Courtesy of Keystone View Company, Meadville, Pa.

THE TRIMMER

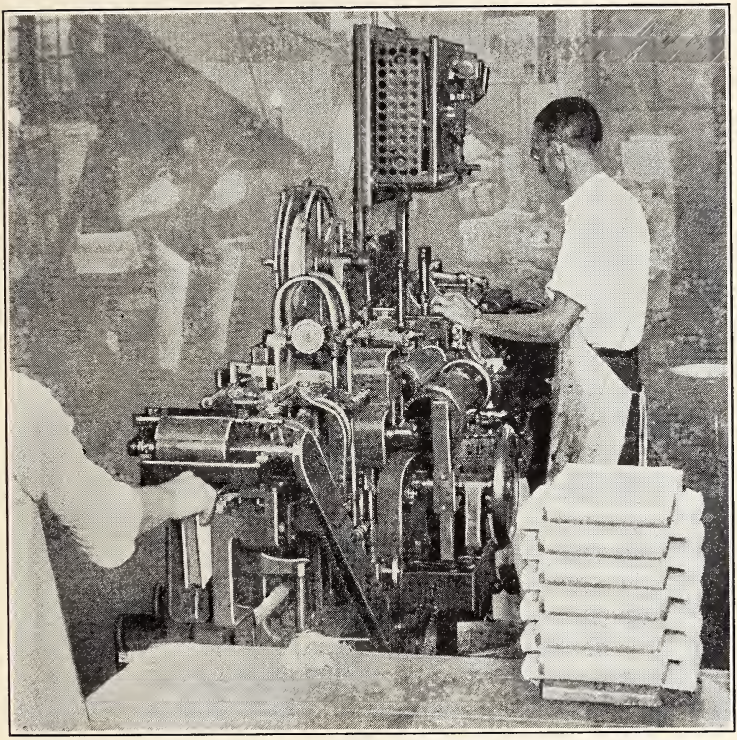
all of the machines. On the other hand, there is perhaps no bindery but has at least one machine. In the smaller binderies or in large binderies where the "run" is small, it may pay to do the work by hand even though there is a machine in the establishment with which to do it.

We found when we visited the composing room a few women employed, an occasional one on the monotype or linotype machine, and a few as proofreaders and copyholders. In the pressroom we found some women as job press feeders on some small presses. In the bindery department quite a different situation exists; a majority of the workers are women. On the whole, men and women keep to their own occupations, the men



Courtesy of International Textbook Co., Scranton, Pa.

ROUNDERS AND BACKERS

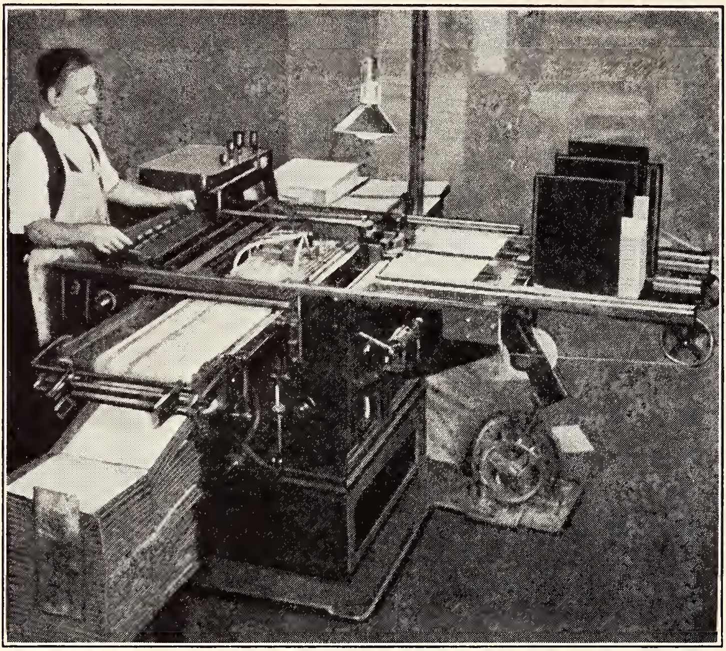


Courtesy of Keystone View Company, Meadville, Pa.

THE LINER-UP

operating the heavy machines and the women operating the lighter machines or doing table work. From the folding operation through the stitching process, women are generally employed. From then on, through the actual making of the covers and the backing of the book, men are at work.

In establishments where pamphlets or books are made, the first bindery worker who touches the product as it comes from the pressroom, is the *folder*. She may crease the printed sheet, with a blunt wood or bone instrument, in such a way that as she finishes the sheet, each page follows the other in order, although uncut. Sheets as they come from the pressroom contain sixteen pages or more and when properly folded are called signatures. She may, instead of doing the work by

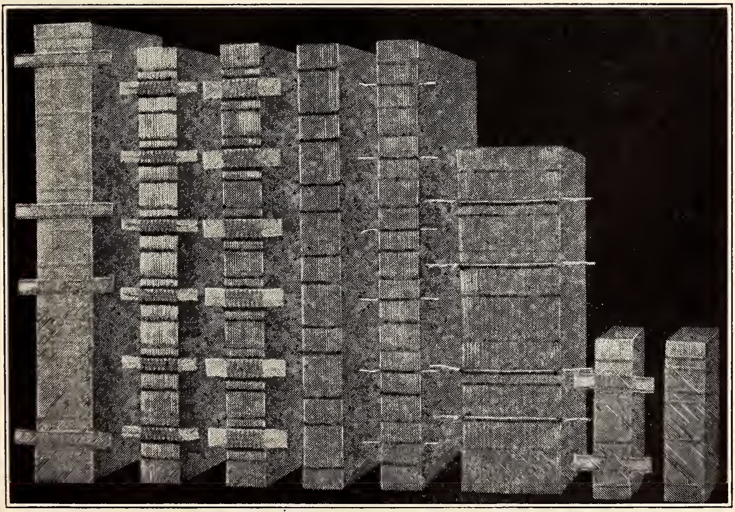


Courtesy of Keystone View Company, Meadville, Pa.

THE CASE-MAKER

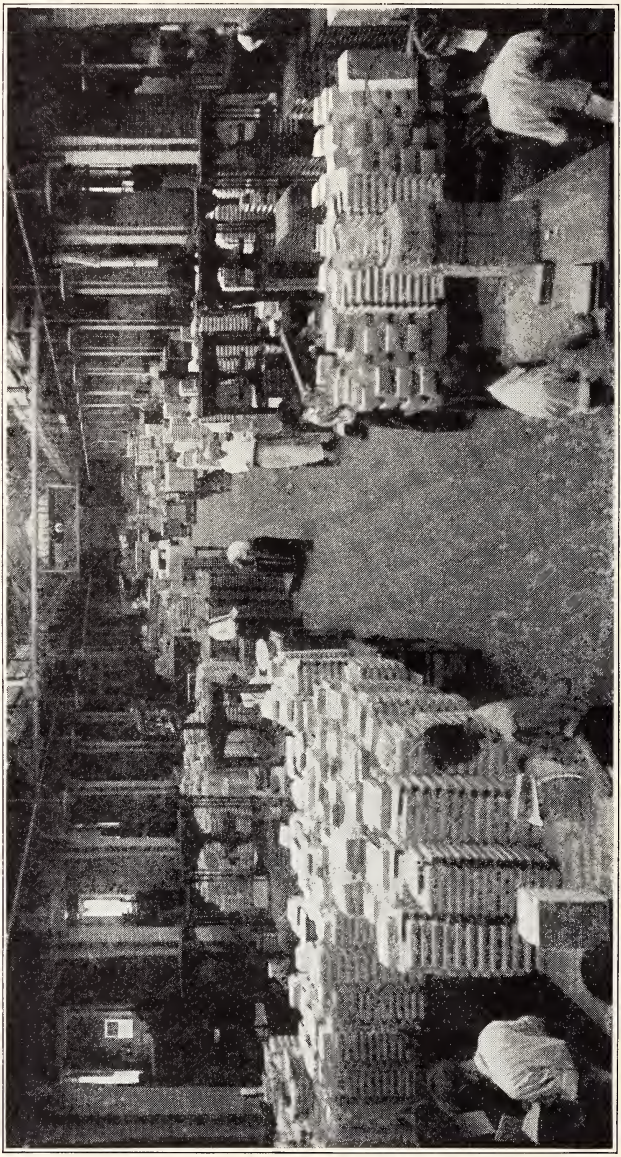
hand, operate a folding machine (men sometimes operate the machine also). The *paster* or *tipper* inserts illustrations, maps, or diagrams either by hand or by machine. Next the *gatherer* collects the signatures in the proper order. If she does the work by hand, she moves along a table, picking up a signature of a different kind from each pile before her. If she works at a machine, the machine moves in front of her. Sometimes men are employed on the gathering machine. The *collator* checks over the signatures, which have been assembled, to see if there are any errors, whether or not all signatures are there, or whether any have been duplicated. The signatures next are sewed together by the *stitcher*, who generally is a woman but may be a man. Some books are still sewed by hand but most are sewed together by machine with thread or wire.

At this point the covering of the book begins and it is here, in the forwarding and finishing processes, that men usually are found. The *smasher* or *presser* operates a huge machine, which forces the air from between the signatures, making the book compact. The *trimmer,* also operating a power-driven machine, squares up or cuts the signatures so that the pages can now be turned. The *rounder* with a hammer or with a machine rounds the back, at the same time making the front edges take a concave form. The *backer* next puts in the groove on which the cover is hinged. He may operate a machine called the roller backer or one called the rounder and backer which not only puts in the groove but also rounds the back. The *liner-up* glues the cloth "head" bands on the back of some books and in the case of all books he glues to the back of the pages a cloth to which later the covers are attached. The edges of some books are gilded by a *gold-leaf gilder,* who scrapes or rubs the edges of the book smooth, coats them with a fluid called sizing, places and presses the gold leaf upon them, and then burnishes the edges with a hand tool, having an agate



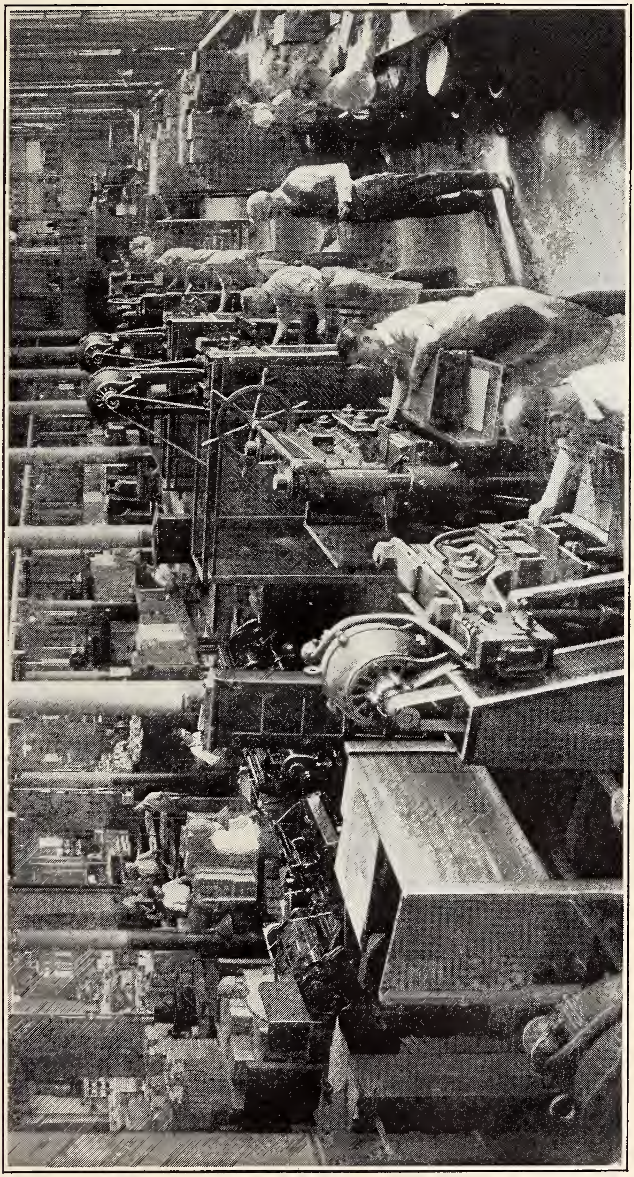
Reprinted from "The Bookbinder," Chicago Vocational Guidance Bureau by courtesy of E. C. Fuller Co.

BOOKS PREPARED FOR CASING IN



THE CASER-IN

Courtesy of International Textbook Co., Scranton, Pa.



STAMPERS

Courtesy of International Textbook Co., Scranton, Pa.

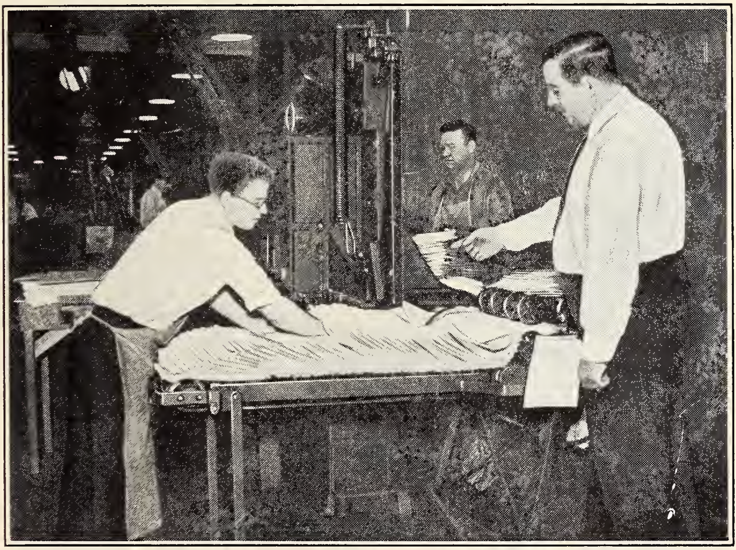
edge. The edges of other books are colored in a marbled design by a worker called the *marbler,* skilled in mixing colors.

In the meantime the stiff covers of the books have been made by the *case-maker,* who may operate a machine or do the work by hand. The outer paper or cloth covering and also the inner lining is spread with glue and carefully pressed upon cardboards, cut the size of the desired cover. Some case-makers do the work by hand. Frequently several men, and perhaps one woman, work together as a crew, each doing a small part of the process. The *caser-in* finally fastens the book into the cover, either by hand or with a machine, which glues and presses the book into the covers. These are considered forwarding processes. The men and women whose work is described in the following paragraph are said to be in the finishing department.

Courtesy of Keystone View Company, Meadville, Pa.

GOLD LAYERS

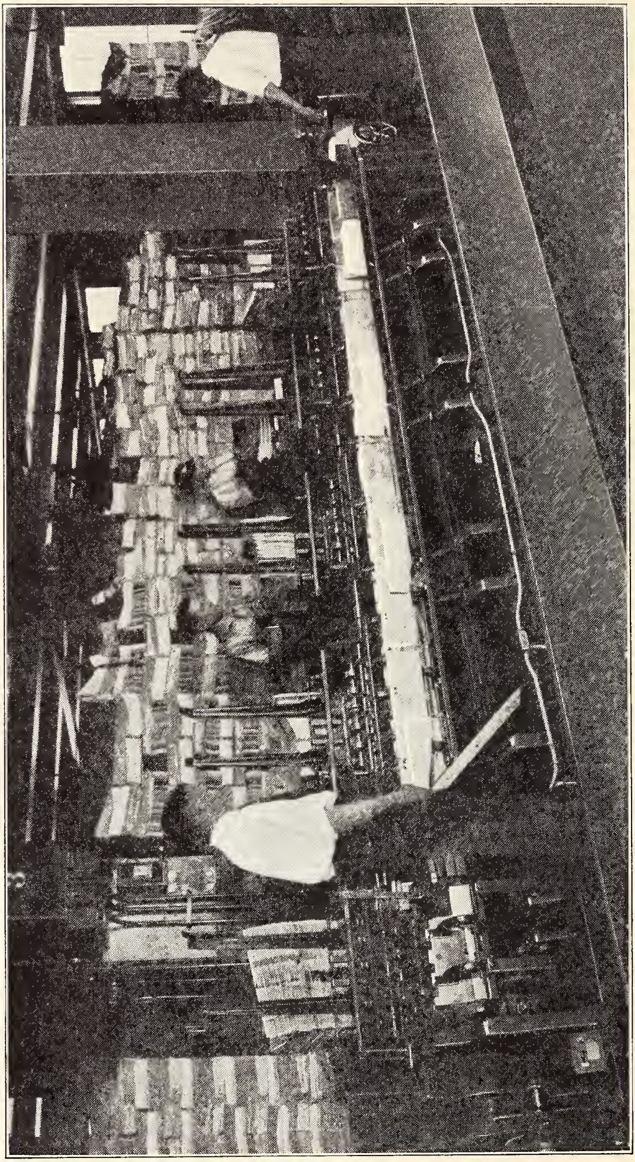
The title and cover design are pressed into the cover by the *stamper,* who operates a machine by hand or by power. A worker, who frequently is a woman, helps at his side, sizing the portions of the cover where the design is to be placed, laying on it the gold leaf, which is to be pressed in, and passing the book on to the stamper. She is called the *gold layer*. On some books an *embosser* produces a raised design on the cover when he operates a certain machine. One more process may be added in the case of dictionaries or reference books. An *indexer* with his machine may cut indentations into the leaves on the front of the books on which are placed letters making it easy for the reader to find the place desired in the book.



Courtesy of Chicago Tribune

MAILER AT A CONVEYOR IN A NEWSPAPER PLANT, WHICH MARKS OFF EACH FIFTIETH PAPER

After drying, the book is ready to be wrapped in its plain paper cover, preparatory for shipping. This is usually done by a woman called the *mailer*. It will be recalled that there are mailers also in newspaper and periodical publishing plants, whose work consists of "addressing, tagging, stamping, labeling, bundling or wrapping, cutting lists or preparing wrappers, operating stencil machines, sorting, routing, dissecting or marking wrappers, taking bundles or papers from conveyors

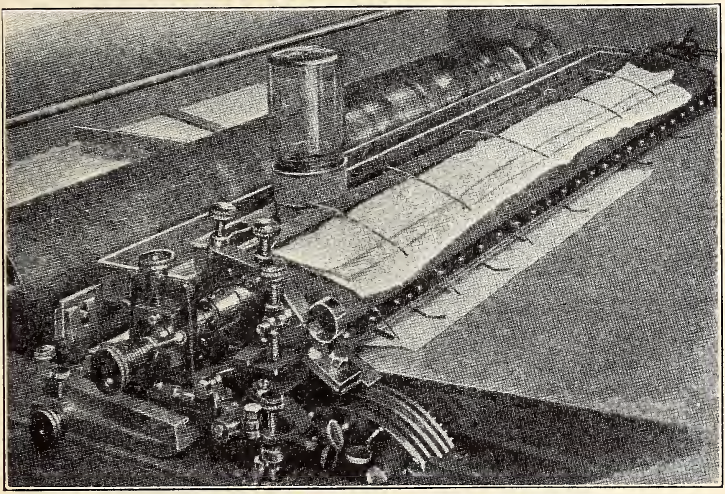


MAILERS IN A NEWSPAPER PLANT

Courtesy of Chicago Tribune

or escalators, stacking, folding, handling, of bundles or mail sacks, distributing, counting of papers (leaving or returning), tying, sacking, delivering papers (to mailers, carriers, agents, or newsboys), inserting or dispatching of papers, envelopes, or magazines." This work is heavy in these plants and men are used.

In the bindery proper there are still a few minor occupations which we have not listed, such as *counting, cleaning* off the pages or covers with art gum, watching the *jogging* machine, which shakes the paper into even piles, operating the *paging* and *numbering* machines, or the *perforating* and *paper-cutting* machines.



Reprinted from "The Bookbinder," Chicago Vocational Guidance Bureau by courtesy of E. C. Fuller Co., Chicago

PAPER RULING MACHINE

The work of one man, the *ruler,* has not been described. He works in binderies where blank books are made, and is responsible for setting up and operating a rather elaborate machine that makes red and blue lines, at varying distances, up and down, and across the blank paper.

Qualifications Needed by Bindery Workers

We have seen how the trade has become more and more divided so that in some establishments the work takes on the nature of factory work. In these establishments the women workers especially have need of great nimbleness of fingers and dexterity to count, insert, and fold at great speed. Men also have to be able to use their hands with skill and with speed. Accuracy, neatness, and patience are qualities that the workers should possess or cultivate. Those workers who change and do several kinds of work must be adaptable and be capable of working with others. Much of the work is done standing and this, together with the speeding up at times, makes it necessary for workers to have good general health. Some workers make considerable use of their eyes, such as the paper ruler and those who examine the books for flaws. Men who work on the covers may find artistic ability of some use. This artistic ability is, of course, a prime necessity for those craftsmen who make the leather, decorated covers by hand.

As in the case of the selection of young persons to become compositors and pressmen, in some instances employers study the applicants carefully through interviews, school records, physical examinations, and standardized tests of mechanical and artistic ability. Women, who are applying for jobs as bookbinders, are sometimes given a manual dexterity test to ascertain their aptitudes in using their fingers accurately and swiftly.

We must also remember that men and women who are considered good workers must always have characteristics that are considered desirable for all people, reliability, dependableness, ability to work with others, and some other qualities that we all could name.

Some Questions to Answer and Problems to Solve

Chapter IV

1. Make a list of products that come under each of the following three headings:
    (a) Products requiring no binding at all.
    (b) Products requiring very little binding.
    (c) Products requiring considerable binding.

    Bring into class an example of each type of product.
2. Write a short theme on "Early Binding of Books."
3. If there is a museum in your city or neighborhood, assign a committee of students to visit the rare book section and bring back an exact report of just what books are in it and what old bindings are represented.
4. Considering the three departments we have studied so far,—the composing, press, and bindery—we find more women in proportion in the bindery room. How do you account for this?
5. Make a list of all the different kinds of workers in the bindery and after each place the number of the page or pages where there is an illustration of this worker.
6. Give in your own words the meaning of the following trade terms:

    signature
    hard binding
    sizing
    table work
    semi-skilled
7. List five qualifications or characteristics that bindery workers should have to be successful.
8. Visit the art rooms, printing shop, school newspaper room, and library and see if you can locate any work being done or ever done which might be classed as bindery work.

CHAPTER V

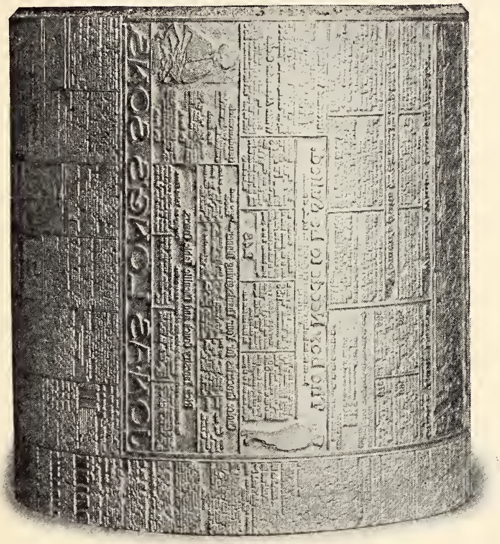
The Stereotyper and the Electrotyper Who Duplicate the Type Forms

The Stereotyping and the Electrotyping Departments

In our desire to see men and women at work in the three main departments of a printing establishment, the composing, the press and the bindery departments, we did not go into several other departments, among them those of stereotyping and electrotyping. When we came to the pressroom, however, we noticed that there were not only type forms from the composing room to be printed on the presses, but also plates, some of them curved, in great numbers, coming from these stereotyping and electrotyping departments.

Whenever a book, pamphlet, or illustration is desired in large numbers, usually over 10,000, it is well to make a stereotype or electrotype. These are metal plates, produced by different processes, duplicating the original type form or illustration. Since any number of the same plate can be produced, it is possible to have several presses running at the same time, thus turning out the work much more quickly. The matter of time is especially important in large newspaper plants, where several editions, with news only an hour or so old, are rushed out, one after the other, on to newsstands. Stereotypes are used especially in newspaper establishments because they are cheaper than electrotypes. They are made in curved form to fit the big cylinders of the web-rotary press, which we talked about before.

If a single type form were used to print the entire edition of a book or pamphlet such as this one, it would become so worn that the last printed copies would become blurred. It is, therefore, of great advantage to make a number of electrotypes from the original type form, so that none will become worn down and the end of the "run" will be as clear as the first. The electrotype is also used when very fine line engravings are desired.



Courtesy of International Correspondence Schools, Scranton, Pa.

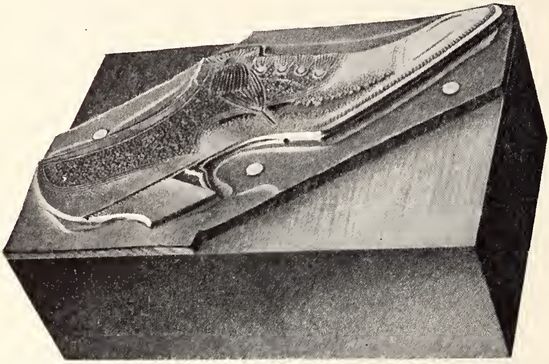
A STEREOTYPE

The type forms or engravings, therefore, come into the electrotyping and the stereotyping departments from the composing or the engraving rooms, here to be transferred to solid metal plates and duplicated. When completed the plates move into the pressrooms where the printing is done.

Number of Workers in the Occupations

Stereotyping and electrotyping departments are to be found in large printing establishments. As a result the workers are located, as a whole, in the large cities. Parts of newspapers printed in small towns even are sometimes prepared in the large centers. These parts, called "patent" insides, are sent to the small local offices where the town news and other events of the day are added.

Some stereotypes and electrotypes are made in establishments doing this work only. According to the biennial census of manufactures for 1935[11], there were only 206 such establishments in the entire United States. The regular census for 1930[10], which lists the people of the United States by occupations, reported only 7,824 electrotypers and stereotypers (the two occupations are given together) for the entire country. There were at that time only 19 women employed in these departments. Out of the total 7,824 electrotypers and stereotypers 914 were in New York, 828 in Chicago, and 253 in Philadelphia. Detroit and Cincinnati are two other centers for these occupations, with 207 and 177 workers respectively. Cities which have over one hundred stereotypers and electrotypers each are Los Angeles, Boston, St. Louis, Cleveland.

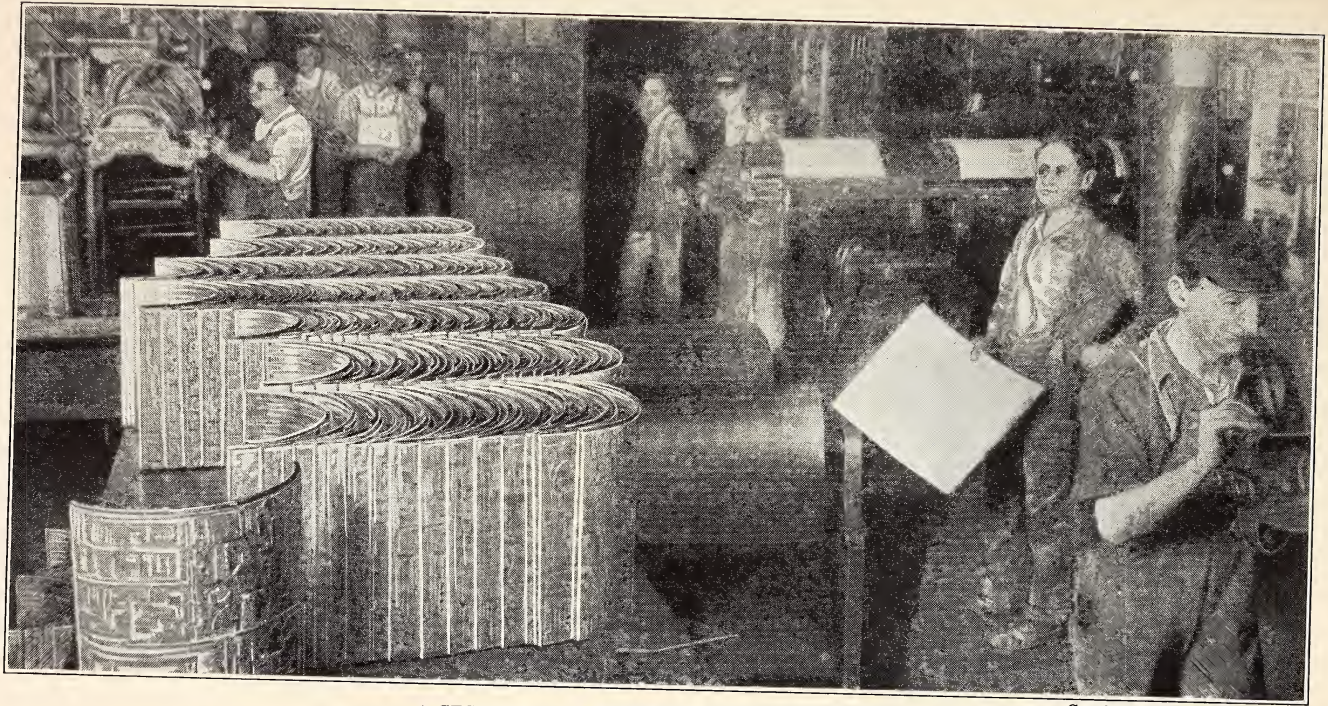


Courtesy of International Correspondence Schools, Scranton, Pa.

AN ELECTROTYPE MOUNTED ON A WOODEN BLOCK

Beginnings of Electrotyping and Stereotyping

A method of printing used in the early 15th century before movable type was invented, whereby an entire page was printed from a large wooden block on which were carved the words, is perhaps the very early forerunner of present-day



Courtesy of Chicago Tribune

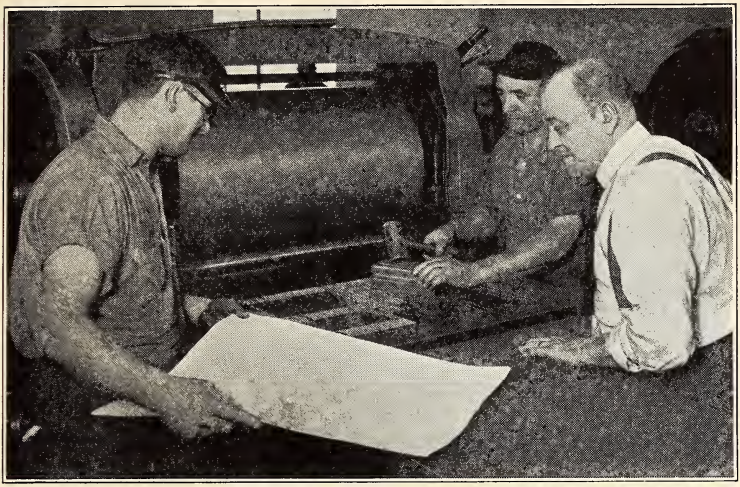
A SECTION OF A STEREOTYPING DEPARTMENT

electrotyping and stereotyping. Today, however, the plates are of metal instead of wood. Not until the 18th century, 1725 to be exact, do we find the real beginnings of what we now call stereotyping. It was at this time that William Ged, a Scotch goldsmith, poured liquid plaster over type, thus making a mold into which later he succeeded in pouring melted type metal. Not until about a century later, 1813, was stereotyping introduced into the United States, and not until 1814 was the first book, the New Testament, stereotyped. About 1860 the first newspapers were printed by means of this process, the *London Times* and the *New York Tribune*.

Electrotyping was a still later development and we are not certain who invented the process. Several men in different parts of the Old World, between 1837 and 1839, are said to have discovered it almost simultaneously, Professor Jacobi of St. Petersburg (now Leningrad), Thomas Spencer of Liverpool, and C. J. Jordan of London. J. A. Adams, a wood carver connected with Harper and Brothers in New York, was the first to introduce electrotyping into commercial printing in 1841, when he reproduced successfully some wood engravings.

The Workrooms

Because metal plates are produced, in electrotyping and stereotyping workrooms are to be found casting machines in which molten metal is cast, and many metal-cutting machines. While the casting is done on a smaller scale than is to be found in large foundries, yet some of the conditions of a foundry exist, heat and fumes. Heat arises not only from the casting, but also from the various kettles and steam tables. Fumes are from three sources, molten lead, gas used for heating, and ink on old lead which, on being melted, gives off a poison known as acrolein. Lead dust is thrown off by the metal-cutting machines. Up-to-date plants, of course, have artificial exhausts and in these the fumes and the heat are greatly reduced. Certain of the electrotypers, for example, the battery man and the caster, are required to have their hands in water or liquid solutions part of the time.



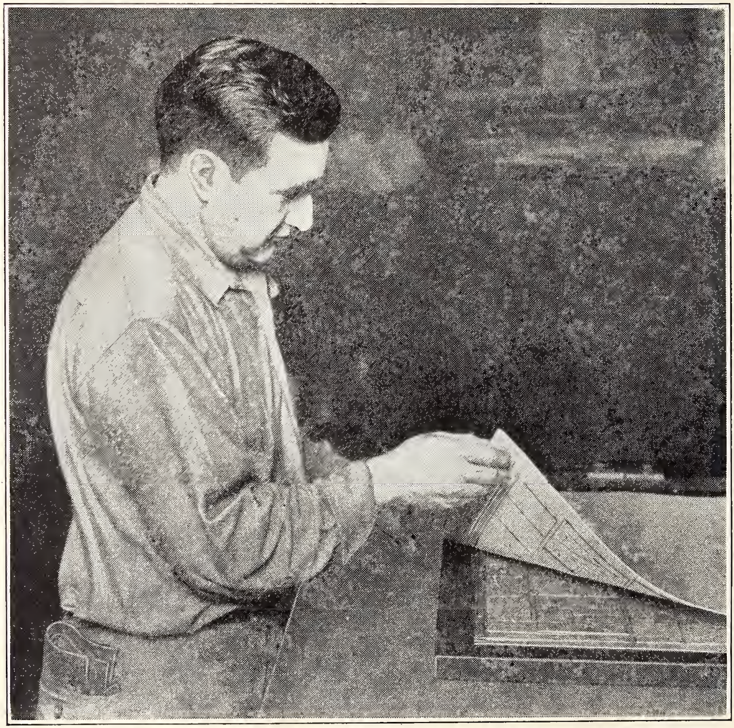
Courtesy of Chicago Daily News

THE MAT ROLLER

Workers in the Stereotyping Department

The men in the stereotyping department are generally required to know the various kinds of work in that department, but, for the most part, each keeps to his regular task and is known by the particular work that he does: the flong maker, the mat roller, the steam table man, the caster, the trimmer. The *flong maker* prepares the papier-mâché pad or flong, by pasting together several sheets of paper of varying thickness, either by hand or by machine. The *mat roller* takes the page of type and engravings received from the composing room, places the flong upon it, covers them both with a blanket of felt, presses the flong down upon the type, either by beating it with a brush or by running the whole into a matrix rolling machine. The impression which results is called the matrix. It is dried sometimes in the same machine that rolls it, sometimes by the *steam table man,* who places it on a table heated by steam or electricity, where it is dried under pressure.

The *caster* may first find it necessary to back the matrix by putting small pieces of cardboard on the blank spaces so that they will not cave in during the casting. He places the matrix in the casting box, where it is pressed back generally into a curved half cylinder. He then pulls a lever on the casting machine which causes the molten lead to flow into the casting box and on to the face of the matrix. He may ladle the molten lead into the casting box by hand. In some newspaper establishments a machine, known as the autoplate, is used, which not only casts the plate but trims it as well. When this is not used the *trimmer* takes the lead plate, weighing in newspaper establishments as much as sixty pounds, and places it below the knives of machines which trim, plane, or shave it, as he finds necessary. He cools the plate by placing it under jets of water. The stereotype is now ready without mounting for use in the pressroom, generally on the web-rotary presses.



Courtesy of Chicago Tribune

THE MATRIX WHICH CONTAINS EVERY WORD AND ILLUSTRATION, BEING LIFTED FROM THE TYPE FORM

Workers in the Electrotyping Department

The men in the electrotyping department may work on only one process, or they may work on several. Each, however, is required to know all the operations of the back room, or molding room, or those of the front room, known as the finishing room.

In the molding room are to be found the wax caster, the molder, the builder, the battery man, and the caster. The *wax caster* prepares the wax molds which take the place of the papier-mâché or flong used in stereotyping. He fills shallow trays, about 15 by 20 inches in size, placed on the case-filling table, with wax, which he has melted in nearby kettles. He takes out the air bubbles by passing a flame over the top of

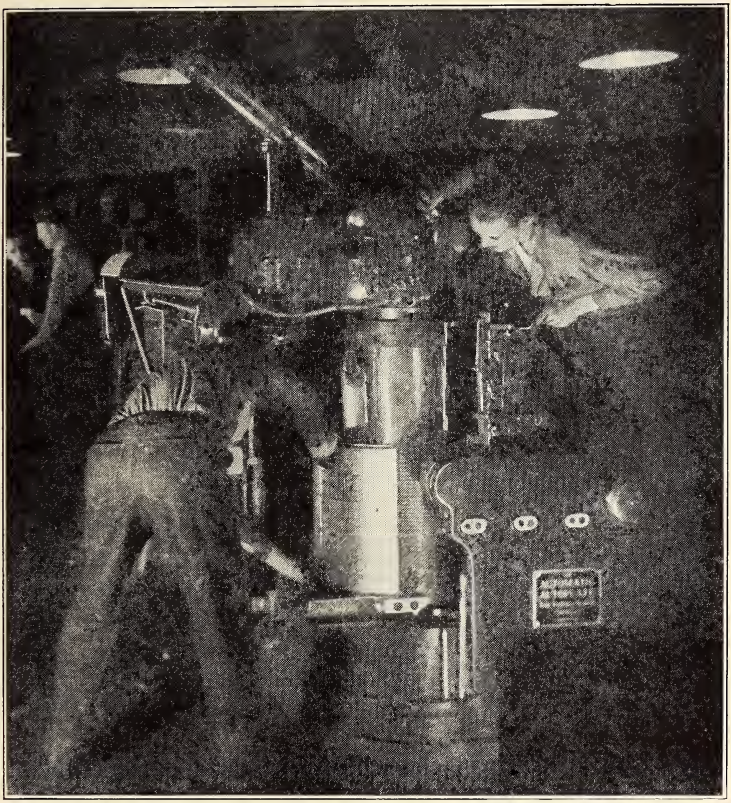
Courtesy of Chicago Tribune

THE CASTER USING AN OLD TYPE OF MACHINE—STEREOTYPING DEPT.

Courtesy of Keystone View Company, Meadville, Pa.

MOLDER WHO IS EXAMINING A WAX IMPRESSION WITH A MICROSCOPE

the wax, levels the top with a shaving machine, and places the cases in a warming oven ready for the *molder*. This worker makes an impression of a page of type or engraving, or a combination of both, in the wax, which is used as the mold for making a metal form by the electrotyping process. He makes the impression by first brushing over the wax mold a fine graphite powder so that the type will not stick. He next places the case on the bed of the molding press, places the page of type face down upon the wax surface and applies the power. If a very fine photo-engraving is being reproduced, he may make the impression on a cold sheet of a special kind of lead by applying enormous pressure with the aid of an hydraulic press. It is very necessary to have the wax mold



Courtesy of Chicago Tribune

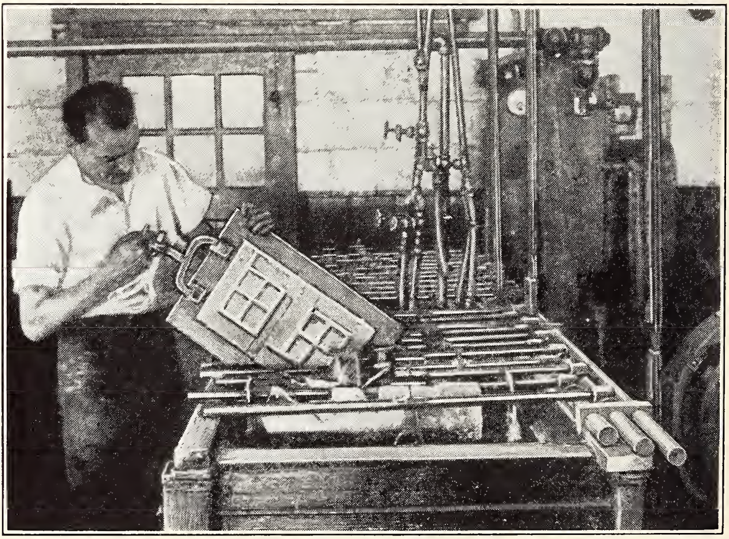
CASTERS USING A NEW TYPE OF MACHINE,
THE AUTOMATIC AUTOPLATE—STEREOTYPING DEPT.

as perfect as possible in order that the electrotype, and as a result the printed page, may be perfect.

The *builder* cuts off the surplus wax from the wax mold, softens the sharp edges by means of a knife or a gas flame, and adds wax to the blank spaces, so that in the electrotype these spaces will be below the printing surfaces and so will not smut. He finally attaches one or two pieces of copper to the mold to form the contact for the electric current.

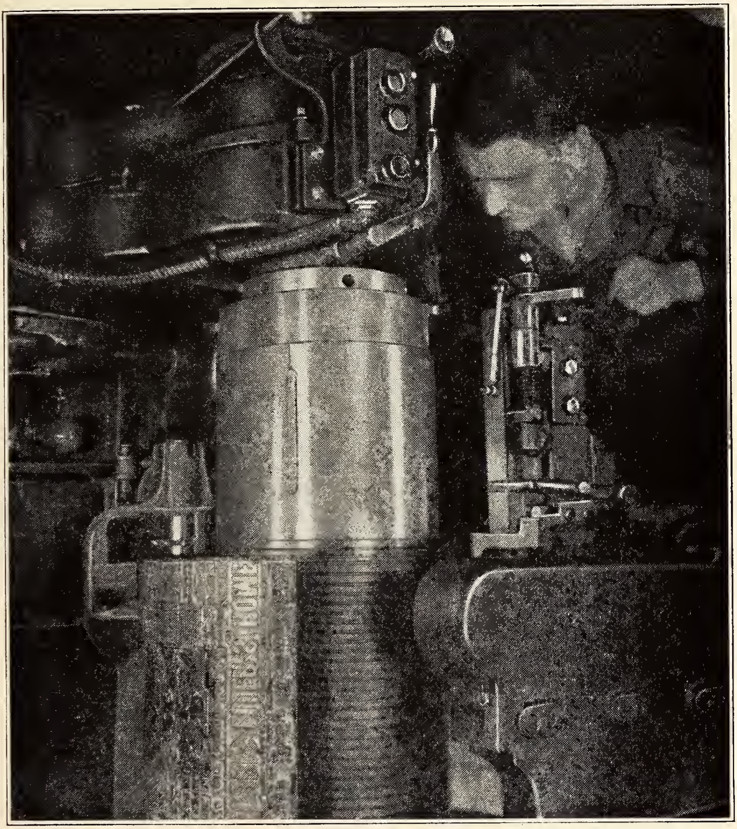
The *batteryman* takes the mold, which, in the meantime, has been coated with black lead in a dry leader or wet leader machine by a helper or black leader boy. This helper has also covered the back and sides of the metal tray, in which the impression is resting, with wax, so that these parts will not be coated with copper in the tank. The batteryman covers the impression with a thin coating of copper by pouring over it a solution of copper sulphate and then sprinkling it with iron filings. He next attaches the case properly to the battery, suspends the case in a tank filled with a solution of sulphate of copper and turns on the electric current. As a result a fine shell of copper is produced in the impression, which the batteryman separates from the wax by pouring boiling water on it. The shell of copper is so thin and delicate, however, that it could not be used in printing.

The *caster,* who operates the metal furnace, strengthens the shell or electrotype by pouring molten metal on to the back, after he has first coated it with a soldering solution and tinfoil so that the molten metal will stick. After the electrotype has cooled, he scrubs the face of it either by hand or by machine, generally using coal oil.



Courtesy of Keystone View Company, Meadville, Pa.

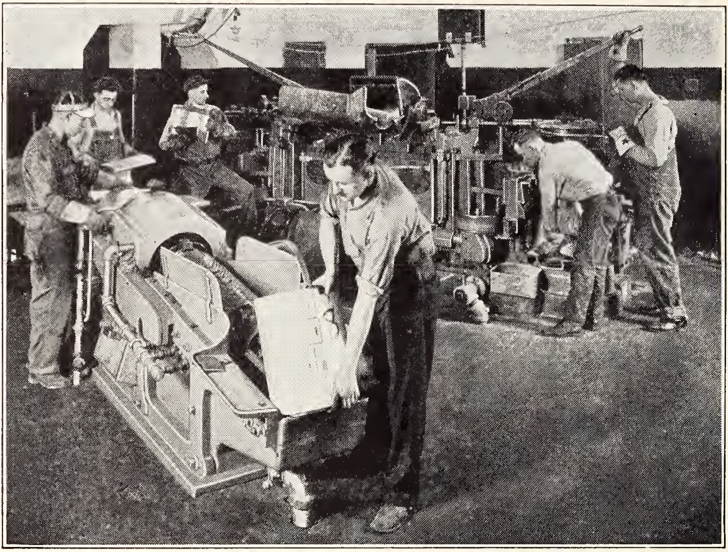
THE BATTERYMAN



Courtesy of Chicago Tribune

THE CASTER INSPECTING HIS WORK—STEREOTYPING DEPT.

The electrotype now goes to the finishing department where the finisher, router, and blocker are at work. The *finisher* examines the electrotype carefully and makes corrections. He may have to level portions with a block and a mallet or raise portions by driving them up from the back. He sometimes cuts out incorrect parts and solders in new ones. The *router* cuts off high places in the metal plate with a routing machine so that these places will not produce smuts on the printed page. He cuts the metal back to the proper thickness, trims the sides; and, if the plate is to be used on a rotary press, he curves the electrotype by applying heat and pressure in the



Courtesy of Chicago Daily News

THE TRIMMER—STEREOTYPING DEPT.

bending machine. The *blocker* mounts the electrotype on a block of wood, sometimes by hand, sometimes with a nailing machine. He trims the edges of the block and planes down the back so that the finished electrotype is of a proper height for printing with other type.

Qualifications Needed by the Stereotyper and the Electrotyper

Both stereotypers and electrotypers should be in good physical condition, for they handle heavy materials and work in heat and moisture. Kettles of molten wax and metal, as well as the casting machines, cause heat; the vats of solutions, the damp mats, and the scrubbing of the electrotypes cause moisture. In badly ventilated rooms the air may be filled with lead dust and with fumes from the molten metal or gas heaters. In modern plants the air may be good, due to up-to-date ventilating devices and exhausts. There is considerable strain on the eyes of those doing the close work, as in the case of the finisher and of those working near the glare of the fires.

Mechanical ability is desirable for all workers in these departments since they all use machines of one sort or another, and the young worker is sometimes tested to see if he has this quality by means of a standardized mechanical ability test. Much of the work requires them also to be patient and extremely accurate. Some of the workers could make good use of a knowledge of chemistry and physics.

Some Questions to Answer and Problems to Solve

Chapter V

1. What is a stereotype? An electrotype? Why are they made?
2. Write a paragraph or two about the early beginnings of electrotyping or stereotyping, using the material you find here and also material which you will look up in an encyclopedia, history of printing, or other reference book.
3. List all the workers in the stereotyping and electrotyping departments. After each place the number of the page where the particular kind of worker is shown in an illustration in this book.
4. Give in your own words as specifically and accurately as you can the meaning of the following words:

   "Patent" insides
   "run"
   fumes
   flong
   matrix

5. The text states that the electrotyper and stereotyper should be in good physical condition. Why is this desirable or necessary?
6. The census for 1930 states that 19 women out of a total of 7,824 workers are employed in the United States in electrotyping and stereotyping departments.
   (a) What per cent of the total number of workers do women represent?
   (b) Analyze carefully all occupations in these two departments and state in which occupations you think the nineteen women might be employed. State why you choose the particular occupations.
7. One desirable qualification for workers in these departments is mechanical ability. What is meant by mechanical ability? Is there any way in which a boy or girl can be tested to see if he or she possesses this quality? Explain.

CHAPTER VI

The Photo-Engraver and the Lithographer Who Make Cuts For Illustrations

Beginnings and Present-Day Uses of Photo-Engraving and Lithography

When we considered the pressman, we noticed in the pressroom, plates containing illustrations which were to be printed. We did not stop at that time to find out who made them, because we wanted to go on to the final department of a publishing or job plant, namely the bindery. These plates for illustrations are made by the photo-engraver and the lithographer.

Photo-engraving is one of the newer branches of the printing industry. In the early days of printing, illustrations were made by wood carvers and they were called wood cuts. This method of preparing illustrations was too slow a process when high-speed presses began to be invented. The development of photography and of chemistry made it possible to discover not only a newer and quicker method, but one which produces more beautiful illustrations. The first picture, reproduced for commercial purposes by means of photo-engraving, is said to be one called "Shantytown," which appeared in the *New York Daily Graphic* in 1880. Newer methods in photo-engraving continue to be invented, for example that of rotogravure, used to reproduce so many of the illustrated supplements of our Sunday newspapers.

Lithography was discovered somewhat earlier than photo-engraving, in 1796, by a composer and playwright, Alois Senefelder, who lived in Bavaria in the southern part of Germany. Too poor to have his plays and music printed, he had taken up the art of printing and reproduced his own works. One day in his hurry to make a laundry list, he wrote on one of the stones used in printing with a particular kind of greasy ink. Later, as he was about to wash off the list, he became curious to see if he could make an impression from it. After many attempts he was successful in transferring the writing from the stone by a process now known as lithography. Not until 1819, however, was lithographic printing used in the United States. Zinc and aluminum have been substituted for stone and the offset press is now generally used for printing. This branch of the industry, known as photo-lithography, is changing rapidly because of new inventions and discoveries.

In photo-engraving, rotogravure photo-engraving, and in lithography, the plate from which the printing is done, is not only made differently, but each has a different surface. Photo-engravings are in relief; rotogravures have the design cut below the surface; and lithographs are made on a flat surface. The product of the photo-engraving and lithographing branches of the industry are varied. In photo-engraving there are reproduced black and white line drawings; photographs; pencil and charcoal drawings; water color or oil paintings. In lithography there are produced fine detail work, such as letterheads and banknotes; and color work such as illustrations, magazine covers, can labels, or large bill posters.

Many of the illustrations make the printed page more interesting and more attractive; in addition, they further explain and make clear the text. Some printed words would have little or no meaning to the reader if an illustration were not nearby which he could follow as he reads the text.

Number of Photo-Engravers and Lithographers

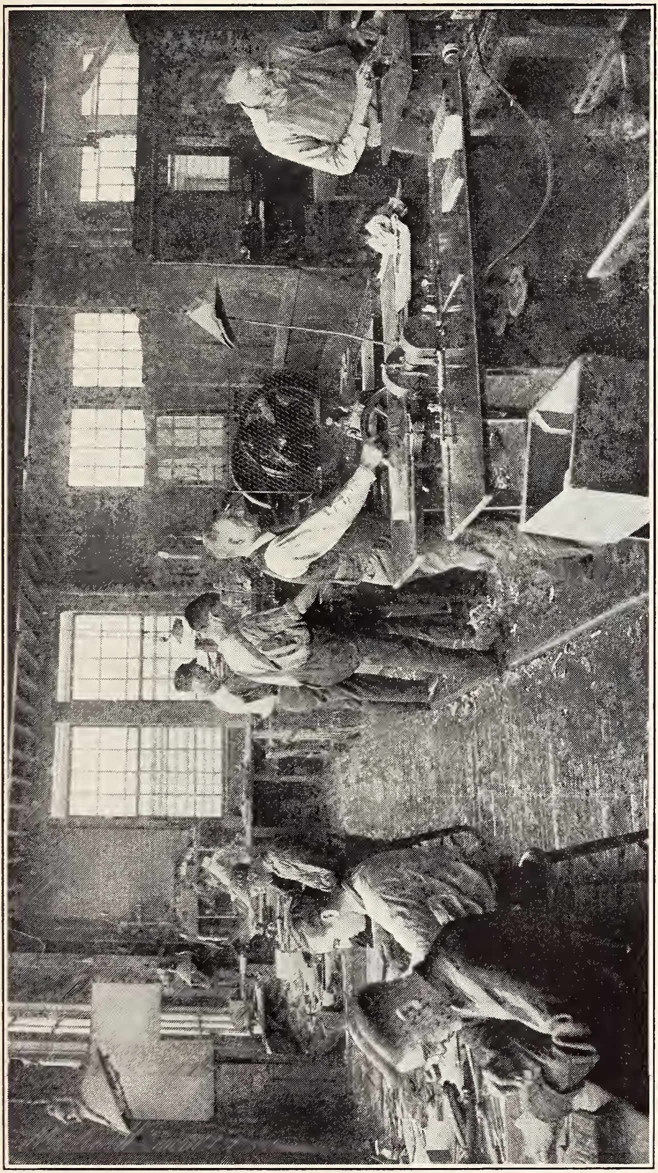
The census of 1930 does not list the various kinds of engravers separately. The total number of engravers in the printing industry (and this includes photo-engravers) is 19,437, of which 690 are women. The biennial census of manufactures for 1935[11] lists 662 separate photo-engraving establishments but it does not tell how many photo-engraving departments there were in establishments publishing books and newspapers. As a result we are not able to tell exactly how many photo-engravers there are in the United States.

The census for 1930[10], however, gives the number of lithographers, 8,868 for the United States, of whom 2,026 were in New York City, 901 in Chicago, and 308 in Baltimore. Fifty-three women lithographers were listed for New York City. The biennial census of manufactures for 1935[11] lists 387 lithographing establishments, which does not include the lithographing departments in general printing establishments.

The Workrooms

The workrooms in the photo-engraving department are most interesting places, since in them is combined the work of the artist, the photographer, and the etcher, who uses chemicals to eat out portions of the plates. As a result we may see large posters, colored by hand, on the racks, or inviting trays of food, which are being photographed by the photographer. He has many large cameras, which he uses with great skill. The dark rooms for developing and retouching the plates are adjoining. The etcher is to be found near his tanks of etching solution. His surroundings are wet and there may be fumes from the acid he uses. Another room contains the wood- and metal-cutting machines, which cause considerable noise and some dust, and are used, as we shall see, for finishing and mounting. The hand finishers work at benches, generally placed near the windows where they can get the best light.

The workrooms in the lithographing department are not less interesting. Men are seen working at benches with drafting boards. One may be seen on a ladder, tracing the image of a figure thrown on the screen by a stereopticon. If photo-lithography is done, the workroom is similar to that found in the photo-engraving department where the photographer works. In the lithography department there are no routing or woodworking machines, for the plates do not have to be mounted. Instead there is the transferring room with its presses, which transfer the key plates to the press plates. One distinguishing feature of the lithographing department is the need for controlling the humidity and the temperature so that the paper is in the proper condition to receive the impression.



Courtesy of International Textbook Co., Scranton, Pa.

THE FINISHING ROOM WITH FINISHERS (LEFT) AND ROUTERS AND BLOCKERS (RIGHT)

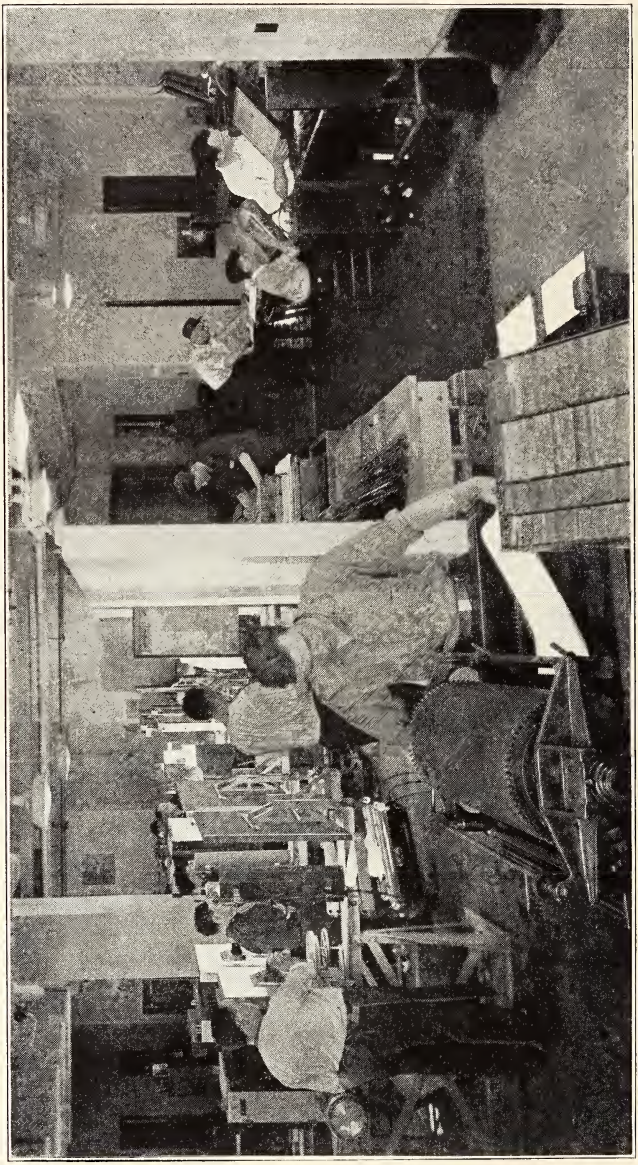


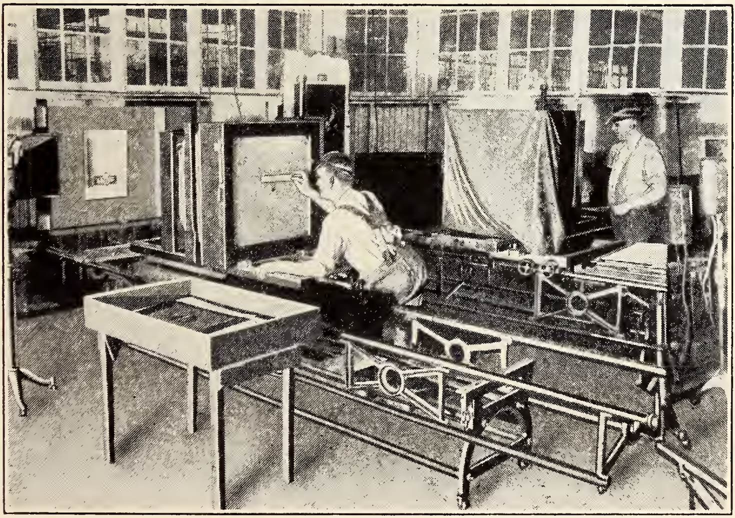
PHOTO-ENGRAVING DEPARTMENT

Courtesy of Chicago Daily News

Workers in the Photo-Engraving Department

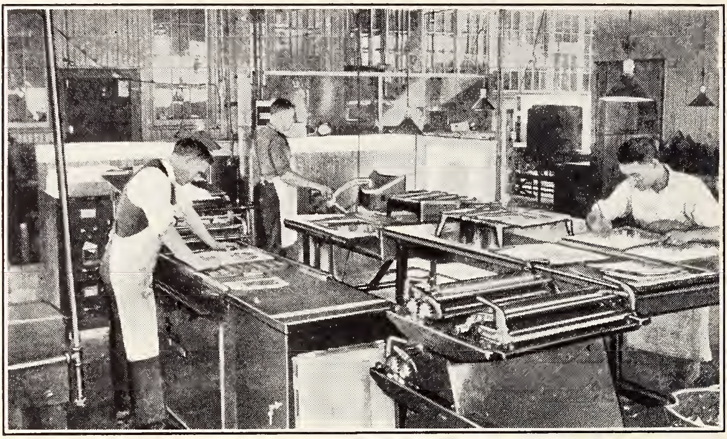
As we have seen, there are a number of varied processes in the photo-engraving department. Depending on the size of the department or shop, a photo-engraver may work at one or all of them. If he works at one, he is known by a special name, such as operator or photographer, stripper, printer, tint layer or Ben Day artist, etcher, router-blocker, finisher, proofer (or prover).

The *operator* or *photographer* mounts the drawing, photograph, or painting on a drawing board and places it on a rack in front of the camera. He makes the necessary adjustment of the arc lights and lens. If he is reproducing a photograph, he places a screen, made of plate glass on which there are extremely fine lines cut at right angles, as many as 200 to an inch, between the object he is taking and the camera. The lines are photographed with the picture and divide it up into tiny dots, which later, when reproduced on the metal plate and etched, provide a printing surface. The dots can be seen by the naked eye in some coarsely reproduced illustrations in



Courtesy of Keystone View Company, Meadville, Pa.

THE PHOTOGRAPHER

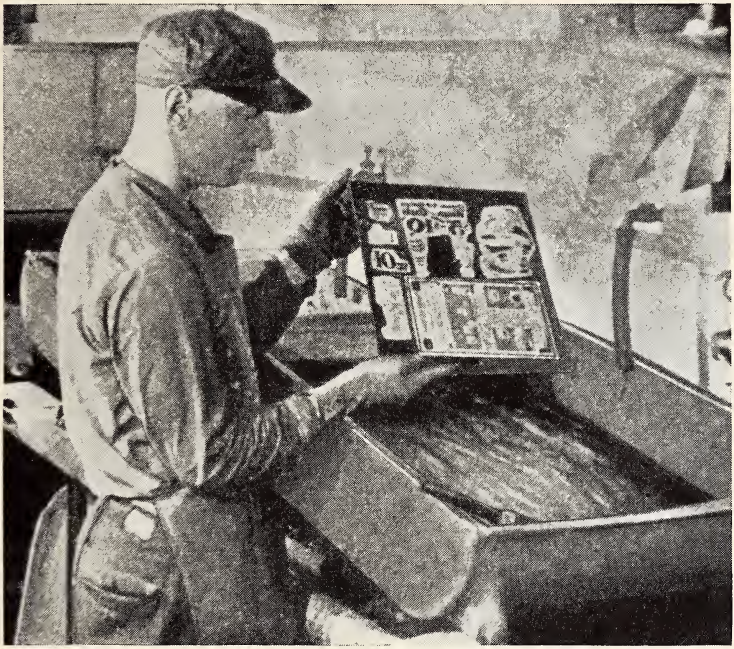


Courtesy of Keystone View Company, Meadville, Pa.

STRIPPERS IN THE FOREGROUND. THE MAN IN THE REAR IS A PRINTER

newspapers. If he is reproducing a painting, he places a color filter before or in the lens so that the various colors are sifted out. Thus photographing only one color at a time, he takes four negatives, of red, yellow, blue, plain white or black, each of which later is made into a cut. He develops the negative in the usual manner, trims it, and sets it in the rack to dry.

Before the image is transferred to the metal plate, it must be reversed. This is done by the *stripper,* who first floods the film with several solutions to make it tougher. After this has dried, he pours on another solution to loosen the film from the plate, strips off the film, reverses it, and places it with others in its new position on a large piece of glass. If portions of the picture are not wanted, the stripper usually opaques them out at this time. The *printer* now proceeds to print the image on metal, either zinc or copper, instead of on paper as in ordinary photographic work. He first prepares the metal plate and floods it with a sensitized solution. Then, after placing the glass with the various images on it next to the sensitized metal, he turns on the arc light and exposes it for several minutes. He now brings out the image on the metal so that it is seen. He does this by various processes, but in each case the image



Reprinted from "The Photo-Engraver," Chicago Vocational Guidance Bureau, by courtesy of "Chicago Tribune"

THE ETCHER

is so impressed on the metal plate that it is hard enough (or can be hardened) so as not to be etched away with the rest of the plate when it goes to the etcher.

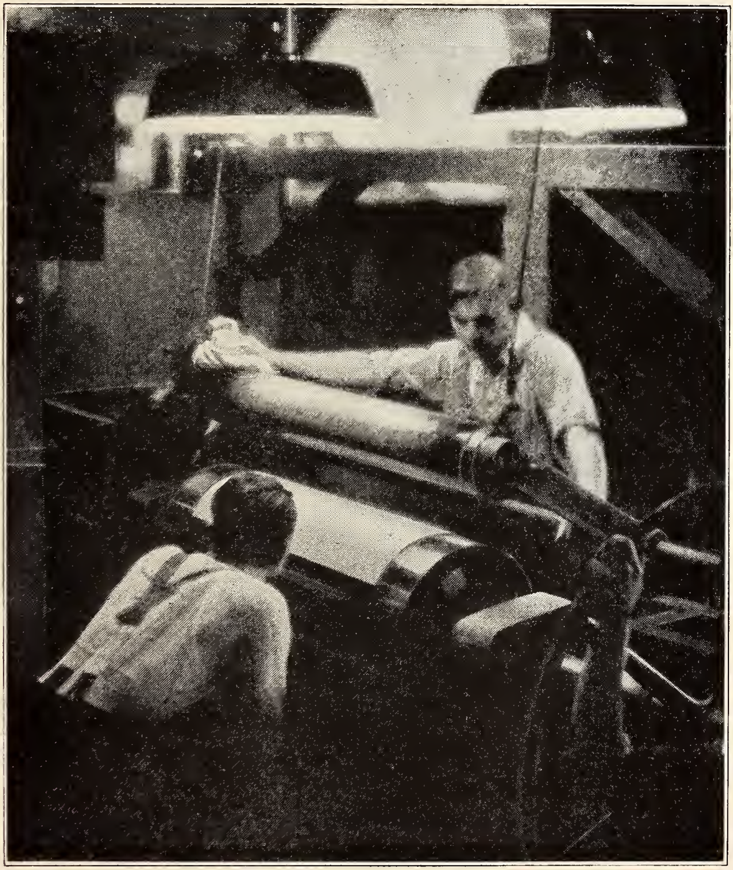
At this point sometimes another worker takes the metal plate to put shadings, patterns, or tints on certain parts of it. He is known as the *tint layer* or *Ben Day artist.* This he does by using certain prepared designs, first "stopping out" with a gelatinous substance those portions which are not to have the design, and inking the design desired, which, printed on a film, is mounted on a wooden frame. He places the inked film in a small device clamped on the copyboard known as the Ben Day machine, and forces the inked design against the metal surface. Before passing the plate on to the etcher, he washes away the gelatinous substance which he placed on the plate.

The *etcher* coats the metal plate with a resinous powder, known as dragon's blood, which adheres to the greasy ink in which the picture is reproduced on the metal, heats it over a flame until the powder is melted, thus making the outline and the shadings of the picture resistant to acid. Some of the metal plates have been hardened previously and do not require this process. He then puts the plate in an acid bath, where the unprotected parts are eaten away, leaving the image in relief. In some plants a special etching machine throws a fine spray of acid against the plate. The etcher is required to watch the "eating process" very closely. He may remove the plate several times and re-powder spots, especially the tiny spots, so that the plate is properly and evenly eaten away. When the depthometer shows that the plate has been eaten away to the proper printing depth, the etcher removes it.

The *router-blocker* cuts away with a machine the portions of the metal that are not needed and deepens the impressions

Courtesy of Keystone View Company, Meadville, Pa.

ETCHERS WHO WORK WITH BRUSHES FROM THE ORIGINAL PAINTINGS so that the surfaces will not smut. He mounts the plate on a block of wood, working by hand or by machine. He finally trims and squares the edges of the block on which the plate has been mounted. The *finisher,* working near the windows and in the best light possible, with hand tools, gravers and burnishers, cleans off the burrs or bits of metal, repairs broken dots, corrects defects, bringing out the light or dark portions of the plate. The finisher frequently works under or inspects his work with a magnifying glass.



Courtesy of Chicago Tribune

COPPER-PLATED CYLINDER USED IN ROTOGRAVURE PHOTO-ENGRAVING

Before the photo-engraving leaves the department to go to the pressroom, the *proofer* (or *prover*) prints a copy of it on a hand or power proof press, to see that the finished reproduction is up to standard.

Workers in Rotogravure Photo-Engraving

One of the newer developments of photo-engraving, as we have mentioned before, is rotogravure photo-engraving, by means of which some of the truly beautiful pictures in our Sunday supplements are reproduced. We have seen that the plates in photo-engraving carry the design to be reproduced in relief. In rotogravure photo-engraving the design to be reproduced is engraved or etched in the metal and is therefore below the surface. This is known as the intaglio process and is based on the same principle as that used by the engravers* on steel and copper plates, who produce greeting and business cards, and wedding invitations.

It will be recalled that when we were in the pressroom, we noticed the special kind of press which printed this type of engraving. We mentioned the fact that cylinders were prepared in the photo-engraving department and that this press had a particular kind of knife, called the "doctor" blade, which scraped off the surplus ink, leaving ink only in the depressions.

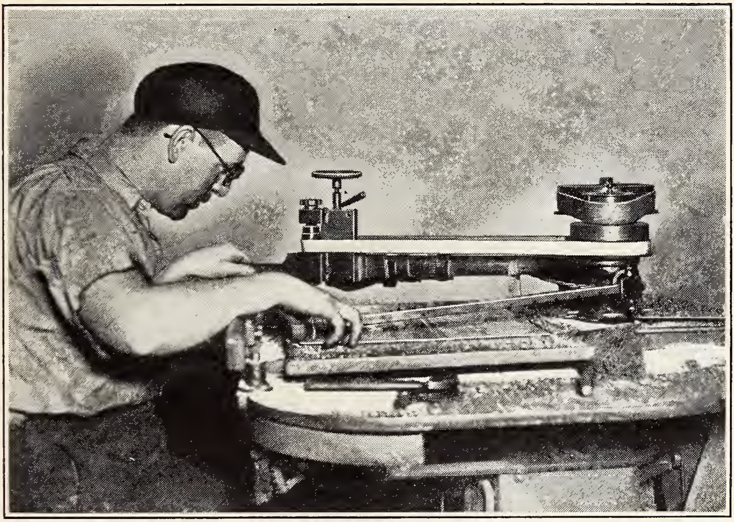
The *photographer, etcher,* and *finisher* in turn work in preparing the design on the copper-plated cylinder, which fits the press, in somewhat the same way as the corresponding workers prepare the flat plate in the photo-engraving department. Two other workers are added, however, the retoucher and the cylinder depositor and grinder. The *retoucher* combines type to be printed with the design, and makes such other changes as are necessary to bring out the high lights and shadows. The *cylinder depositor* and *grinder,* after the cylinder has been used, grinds off the cylinder and replates it, ready to be used again.

---

*These workers have not been mentioned before. They work either by hand or by machine. The hand engraver waxes a thin polished plate of copper and draws guiding lines on it. After roughly drawing or writing in the letters backwards, he cuts into the metal with gravers, following the letters or design which he has roughly drawn in. In the case of machine engraving, the operator traces the design in the wax, thus exposing the metal plate. The metal plate is etched with acid, the engraver perhaps doing some retouching with his hand tools.

Qualifications Needed by the Photo-Engraver

The workers in a photo-engraving department should have good general health because they work indoors, under a variety of conditions, some of which are injurious to health. Some of the men work in wet or damp surroundings, others are exposed to fumes from various chemicals, or from gas used in drying. Still others may be exposed to powder required in certain processes, or to dust, metal and wood, produced by the wood- and metal-cutting machines. Up-to-date establishments have various exhausts and ventilation systems so that these hazards can be reduced to a minimum.



Reprinted from "The Printing Industry" by courtesy of the Vocational Bureau, Cincinnati Public Schools

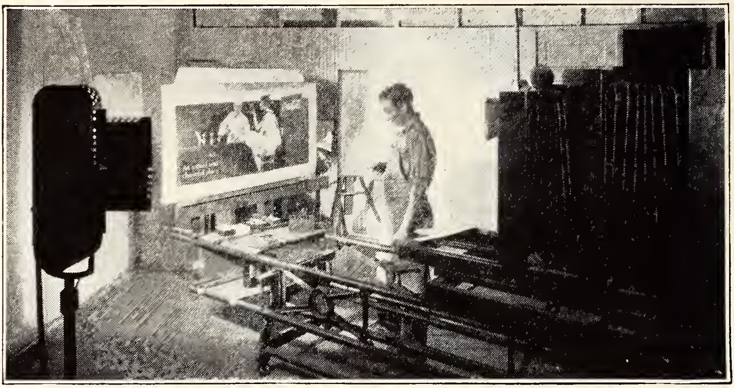
THE ROUTER-BLOCKER

Some workers are subjected to eye strain and therefore should have unusually good eyesight. These are the ones who work under artificial light or on very fine, close operations. They should not be color blind, for since at times they work in color, they must have an appreciation of color and tone values.

The work in a photo-engraving establishment is so varied that men of different abilities can be used. Men with artistic ability are needed as color etchers, Ben Day artists, or finishers; men with manual dexterity are needed as strippers, etchers, or finishers; those with mechanical ability, as router-blockers. As we have seen before, young workers sometimes are tested to see if they have these aptitudes. Great patience, well-controlled nerves, accuracy, initiative are some of the qualities needed by all workers.

Workers in the Lithographing Department

Several methods are used in lithography today, depending upon the nature of the subject to be reproduced. Color work, such as calendars and greeting cards is reproduced by the photographic method with the aid of the photo-lithographer and the lithographic color-artist retoucher, ordinarily known as the process artist. Color work, such as outdoor advertising posters is produced with the aid of the crayon artist, working by hand. Bank stationery for example, checks, letterheads, and deposit slips, as well as bonds and stock certificates (known in lithographic circles as commercial work), may be executed by the stone engraver, although this type of worker has almost disappeared.



Reprinted from "The Lithographer," Chicago Vocational Guidance Bureau, courtesy of Edwards & Deutsch Lithographing Co.

THE PHOTO-LITHOGRAPHER

The stone or metal plate, before the design is reproduced upon it, must be especially prepared by the *stone* and *plate preparer* or *grainer*. By rubbing pumice over the surface of the stone by hand, or by operating a machine which agitates the metal plate, covered with steel balls, pumice, sand, and water, the preparer produces a surface on the stone or metal so that it will hold water or ink.

In some instances after the picture to be reproduced has reached the lithographing establishment, it may be found necessary for the *letter artist* to draw on the picture certain lettering.

The *photo-lithographer* uses a new method of lithography. It is this method of lithography that is developing very rapidly at the present time and is apt to develop still further in the future. The photo-lithographer places on a rack in front of the camera the photograph or painting to be reproduced, adjusts the camera and the arc lights, and finally exposes the photographic plate. He sometimes uses a screen to break up the photograph into dots, or color filters, one at a time, so that the final reproduction may contain all the colors of the original. He develops the negative in a nearby darkroom with the proper chemicals. From the negative he may make a positive, which again shows all the details in their correct position. At this point frequently a worker, known as the *lithographic color-artist retoucher* or *process artist* assists. If certain details of the picture are to be made less prominent, he paints them out; if parts should be more prominent, he adds certain details. From this positive a final negative is made.

Reprinted from "The Lithographer," Chicago Vocational Guidance Bureau, courtesy of R. R. Donnelley & Sons Co.

THE PLATE GRAINER

The *press plate maker,* sometimes called the *transferrer,* takes the color-corrected negative, locks it up in a precision frame in a photo-composing or step-and-repeat machine. He covers a blank zinc press plate with a coating, which causes it to be sensitive to light. After the plate has been sensitized, he places it in the photo-composing machine. The precision frame, with the negative, he places in contact with the press plate in the desired position; he exposes the negative with the aid of a power arc light, causing an image from the negative to be printed in the exact position desired on the press plate. This operation is continued step by step until the desired number of prints or exposures are made. After the prints have been made on the press plate, it is developed by the plate maker so that the images of the subject are clearly discernible. After the plate has been fully developed, it is etched with acid, thus de-sensitizing it so that when the ink rollers come in contact with the plate on the press, the ink will adhere only to the image and not to the clean surfaces.

Reprinted from "The Lithographer," Chicago Vocational Guidance Bureau, courtesy of Edwards & Deutsch Lithographing, Co.

CRAYON ARTIST, WORKING WITH STEREOPTICAN

The *crayon artist* or *crayon lithographer,* who, like the photo-lithographer, does color work, copies the poster or illustration directly on to the stone or metal plate with a certain kind of greasy crayon, which attracts or holds the ink.

The man today, who continues to work most nearly in the manner of the original lithographer, is the *stone engraver,* who aids in the making of stock certificates, bonds, checks, and other bank stationery. The stone engraver, after receiving the design to be reproduced, places over it a piece of celluloid or tracing paper, on which he outlines the design with a steel needle. He next fills the tracing with colored chalk, and places the chalked design face down upon the prepared stone, thus leaving an outline of the design. Working part of the time under a magnifying glass, he engraves or cuts the design into the face of the stone, using very pointed steel needles. After the engraving has been completed, a special coating is placed on the stone and shaded portions are drawn in with fine lines by a ruling machine. The stone engraver then "stops out" the various shaded portions with asphaltum, using a fine brush. After the shading has been properly stopped out, the ruling or shading is etched into the stone with an acid. The engraving is then inked in with a dauber and is considered finished, ready for the transferrer or pressman.

While the press plate in photo-lithography generally is made by the transferrer who uses the step-and-repeat machine, the press plate in stone engraving is usually made by the transferrer who does the work by hand. The *hand transferrer* inks up the stone engraving with a dauber, and pulls the required number of impressions from the engraving in a hand transfer press. These impressions he "sticks up" in position on a layout sheet. He next transfers the impressions from the sheet to a sensitized press plate in a large press-plate transfer press. These hand-transferred press plates are not sensitized in the same manner as the press plates used for photographic purposes but are sensitized by being given a bath of alum solution. After the images have been transferred to the plate, it is given a very light etch with a solution of gum arabic and tannic acid, which de-sensitizes it. The transferrer then rolls up the plate with a hand ink roller, keeping it moist with a damp cloth so that when the ink roller comes in contact with the plate, the ink will adhere only to the image and not to the surfaces of the plate, which are to be kept clean. After the plate has been thoroughly rolled up, it is powdered with rosin and soap stone to protect the work from the strong acid which is then applied, thus thoroughly de-sensitizing the plate and making it ready for the press.

Reprinted from "The Lithographer," Chicago Vocational Guidance Bureau, courtesy of R. R. Donnelley & Sons Co.

THE PROOFER

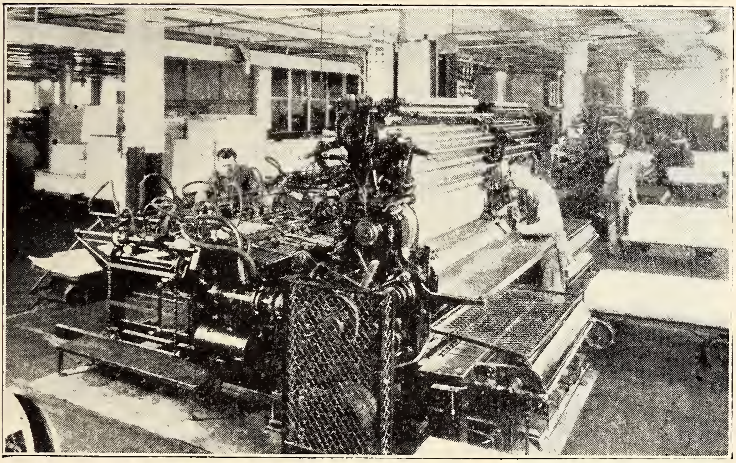
A proof is taken by the *proofer* or *prover* on a flat-bed offset hand press.* Since color is used so abundantly in lithographing the mixing of colors is of great importance. So also is the printing of each color plate over the other carefully and accurately so that the final reproduction may be correctly colored and each detail of the picture fit exactly where it should. The prover furnishes samples of each colored plate as well as of the finished colored reproduction obtained by combining all of them.

The *pressman* who prints from lithographic plates uses several special presses, some of which have been described in the chapter on the pressman. Because the offset press in its operation is so different from all other presses, we shall describe it somewhat more fully now that we have seen how the plates are made. The reason that this press is called an offset press is because the work is printed from the press plate to a rubber blanket and "offsets" from the rubber blanket on to the paper, requiring three different cylinders, one for the press plate, one for the rubber blanket, and the third for the paper.

---

*See page 32.

The press plates are originally flat, about $\frac{21}{1000}$ of an inch in thickness and sufficiently pliable so that they can be bent around and clamped on the cylinder of the press. We must remind ourselves again that in order to print from lithographic plates, they must be kept in a moist condition so that when the ink roller comes in contact with the plate, the ink will adhere only to the image and not to the clean parts of the plate. In order that the plate may be kept in a moistened condition, a moist felt roller, which runs in a water fountain, must roll over the plate before the ink roller comes in contact with the plate.



Reprinted from "The Lithographer," Chicago Vocational Guidance Bureau, courtesy of R. R. Donnelley & Sons Co.

THE OFFSET PRESSMAN

Qualifications of the Lithographer and of the Offset Pressman

The qualities needed by those in the lithography department are pretty much those needed by the men in photo-engraving. Artistic ability, mechanical ability, including manual dexterity, an interest in chemicals and chemical reaction are needed. Good eyesight, which includes fine discrimination of color and tones in black and white, is essential. Not only must the lithographer have these characteristics but also the offset pressman, who is responsible for the exact duplication of the original picture in respect to color and tone. These qualities can be checked by various means as we have seen, by past performance in school, by interviews, and by some standarized tests.

Some Questions to Answer and Problems to Solve

Chapter VI

1. Lithography and photo-engraving are used for reproducing different kinds of work. Bring into class a number of examples of different kinds of illustrations labelled to indicate by which process you think the work was done. State why you have arrived at your conclusions.
2. Illustrations help to explain the text. (a) Have the illustrations in this book helped you to understand certain work and ways of doing it better than if there had been none? If so, give a concrete example. (b) By what process do you think the illustrations in this book were made? What makes you think as you do?
3. The 1930 census states that of 19,437 engravers (which includes photo-engravers) 690 were women. What per cent were men and what per cent were women?
4. List all the workers for whom it is desirable to have artistic ability and training: (a) in the photo-engraving department; (b) in the lithographing department.
5. Make a list of all workers for whom it is desirable to have mechanical ability or knowledge: (a) in the photo-engraving department; (b) in the lithographing department.
6. What scientific knowledge is needed by some workers in these two departments? Explain why this is needed.
7. State in simple words which a friend of yours in eighth grade could understand, the meaning of the following words:

   sensitized solution
   images
   "stopping out"
   dragon's blood
   eating process

8. What particular work in these two departments may be dangerous? How may the dangers be reduced?
9. To what union organization would a photo-engraver belong? A lithographer? (See Appendix II, page 144)

CHAPTER VII

More Information About the Printing Industry in General

It will be recalled that at the beginning we took a bird's-eye view of the industry before we started to look at the workrooms to see there what the many men and women did at their work benches and at the machines from day to day. At that time we said that there were other interesting facts about the industry as a whole, which we would delay talking about, such as wages, hours, seasons, and rules and regulations made by the workers and by the employers in the industry. Now that we have seen the men and women in the composing room, the pressroom, the bindery, the stereotyping and electrotyping departments, the photo-engraving and lithographing departments, at their many and skilled tasks, we shall return to those facts and problems of the industry as a whole, which we have not yet discussed.

Facts About the Men and Women Who Work in the Printing Trades

RELATIVE NUMBER OF WORKERS IN THE VARIOUS PRINTING TRADES.—We have, as we have taken up each department, tried to find out how many there are of each kind of worker. This was difficult to do because the Federal census did not always count the workers separately for each department as we found them. It will be remembered that photo-engravers were counted with engravers and that bindery workers were classed and counted along with the semi-skilled workers in the industry. It is always interesting and important, too, to know which trade has the largest number and which has the smallest number of workers, and how large is each of the trades in relation to the others.

Although the census does not show each of the printing trades separately, yet we can get some significant facts from a comparison of such figures as are given. Table II, containing this information, is a simple table, which not only every grown person but every boy and girl will be able to read. From the second, fourth, and sixth columns of figures, which give the percentages, the relative importance of some of the trades, so far as number of workers is concerned, can be found for 1930, 1920, and 1910.

TABLE II

Relative Number of Workers in the Various Printing Trades for 1910, 1920, and 1930 [12]

Occupations	1930		1920		1910	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
Apprentices—Printers and Bookbinders	10,928	3.2	11,603	4.2	12,395*	4.9
Compositors, Linotypers, and Typesetters	183,632	53.4	140,165	51.2	127,589	50.9
Electrotypers and Stereotypers	7,824	2.3	5,494	2.0	4,368	1.7
Lithographers	8,868	2.6	8,222	3.0	8,138	3.3
Engravers	19,437	5.7	15,053	5.5	13,967	5.6
Pressmen and Plate Printers	31,215	9.1	18,683	6.8	20,084	8.0
Operatives — Printing, publishing, engraving	70,871	20.6	66,709	24.4	58,758	23.4
Laborers — Printing, publishing, engraving	10,822	3.1	7,981	2.9	5,484	2.2
Total	343,597	100.0	273,910	100.0	250,783*	100.0

*Approximate only.

There are many interesting facts hidden in this table, only a few of which we are going to point out. The others we shall leave to those boys and girls to discover who are able to work by themselves. Compositors, linotypers, and typesetters form the largest group. In 1930, they composed 53.4 per cent of the total number of workers in the printing trades. This portion has been steadily increasing since in 1910 the proportion was 50.9 per cent and in 1920, 51.2 per cent. Even though the stereotypers and electrotypers are added together, they form the smallest group in the printing trades, 2.3 per cent of the total.

TABLE III

Relative Number of Men and Women in the Various Printing Trades 1930[12]

Occupations	Total		Men		Women	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
Apprentices — Printers and Bookbinders	10,928	100.0	10,575	96.8	353	3.2
Compositors, Linotypers, and Typesetters	183,632	100.0	173,363	94.4	10,269	5.6
Electrotypers and Stereotypers	7,824	100.0	7,805	99.8	19	.2
Lithographers	8,868	100.0	8,643	97.5	225	2.5
Engravers	19,437	100.0	18,747	96.5	690	3.5
Pressmen and Plate Printers	31,215	100.0	31,215	100.0	—	—
Operatives — Printing, publishing, engraving	70,871	100.0	40,457	57.1	30,414	42.9
Laborers — Printing, publishing, engraving	10,822	100.0	9,440	87.2	1,382	12.8
Total	343,597	100.0	300,245	87.4	43,352	12.6

WOMEN WORKERS.—In going through the workrooms from time to time we spoke about women being employed on certain machines or in particular parts of the trades. In the composing room we found them as proofreaders and operators of the linotype and monotype machines; in some pressrooms as job press feeders on the simple presses; in the bindery on some machines and at most table work. In fact, in the bindery we found that a majority of the workers were women. When we visited the stereotyping department, we saw that stereotypes were made, weighing as much as 60 pounds. These, of course, are too heavy for most women to lift. The census listed 19 women stereotypers and electrotypers, however, for the United States. In the photo-engraving and lithographing departments a few women work as retouchers.

Table III shows the proportion of men and women in the various printing trades in 1930. If one selects an occupation and follows the figures across from left to right, one finds the proportion of men and women in that occupation. For example, among compositors, linotypers, and typesetters, 94.4 per cent are men and 5.6 per cent are women. Women are to be found in largest numbers among operatives in printing, publishing and engraving, where they form 42.9 per cent of the total number employed. When all occupations are taken together, we find that women represent 12.6 per cent of the total number of workers in the printing trades, as listed here.

NATIONALITY AND RACE OF WORKERS.—The printing industry is said to have an unusually large number of native Americans and the census shows this statement to be a fact. Over 85 per cent of the compositors, linotypers, and typesetters in 1930 were born in the United States and had parents who were born here.[13] Only 12 per cent were foreign born and it must be remembered that some of these work on foreign language newspapers, where a foreign language, German, Italian, or Swedish is required. In contrast to this, 23 per cent of the carpenters and 34 per cent of the bricklayers were foreign born.

A somewhat different situation exists, however, in the case of the lithographers, 20 per cent of whom were born in a foreign country. Many have come from Germany where, it will be remembered, lithography was first invented.

Very few Negroes are employed in the printing industry although a few are to be found in each of the printing trades. They sometimes run small job shops themselves and may be employed in printing establishments publishing magazines and newspapers for their own race. Of the 183,632 compositors, linotypers, and typesetters only 2,101 Negroes were employed according to the census of 1930. Even in the semi-skilled and laborers' jobs in connection with the printing industry Negroes do not take a prominent part. Out of 70,871 semi-skilled workers and laborers employed in 1930 in connection with the printing industry, only 1,210 were Negroes, or about 1.7 per cent. Negroes, on the other hand, form 9 per cent of the total population.

The number of Indians, Chinese, Japanese, and other racial groups is too small to mention. A few of each race are to be found scattered here and there in some of the printing trades.

YOUNG WORKERS IN THE TRADES.—To boys and girls especially, one other fact about the workers will be of interest—just how many of them are young persons like themselves, under eighteen years of age. (Shortly in the Chapter on Apprenticeship we shall see how the apprentices are learning the trades.) The census of 1930[14] tells us that there were 22,714 young people in the printing trades under eighteen years of age whereas in 1920 there were 29,725.[15] Some were working as errand boys, carrying messages and supplies from one department to another. These boys may, if they are determined to learn the trade, put in their applications to become apprentices. They will have to wait their turn on the list, for the apprenticeship places are much sought after because they train for the jobs held by the skilled workers or journeymen. Some of these boys may assist at odd jobs in the pressroom or be hired as fly boys to take materials from the presses. Girls under eighteen years of age may be copyholders and frequently are found in binderies doing table work.

In Table III*, 10,928 apprentices (some of whom are over eighteen years of age) are listed, 10,575 boys and 353 girls. In the 1920 census the apprentices numbered 11,603, 10,366 of whom were boys and 1,237 of whom were girls. In both instances where we have facts regarding young workers, we find a decrease in their number during the ten-year period from 1920 to 1930.

*Page 91.

Conditions Which Surround the Worker at His Work

Boys and girls are anxious to know how men and women, boys and girls of their own age, live in other parts of the world; what clothing they wear; what queer and interesting customs they have; what sort of houses they live in. It is just as important that we know how people in our own community live during the working day, which amounts to about one-third of the time in the lives of grown persons. It is important for us to know not only what trades and professions our father, brothers, sisters or our neighbors work at when they leave in the morning to go to the factories, workshops, or offices, but also what conditions are in these workrooms which influence their lives. It is important for us to know about the hours of work, wages, seasons of employment, which affect their lives not only while they are at work but during their leisure hours as well.

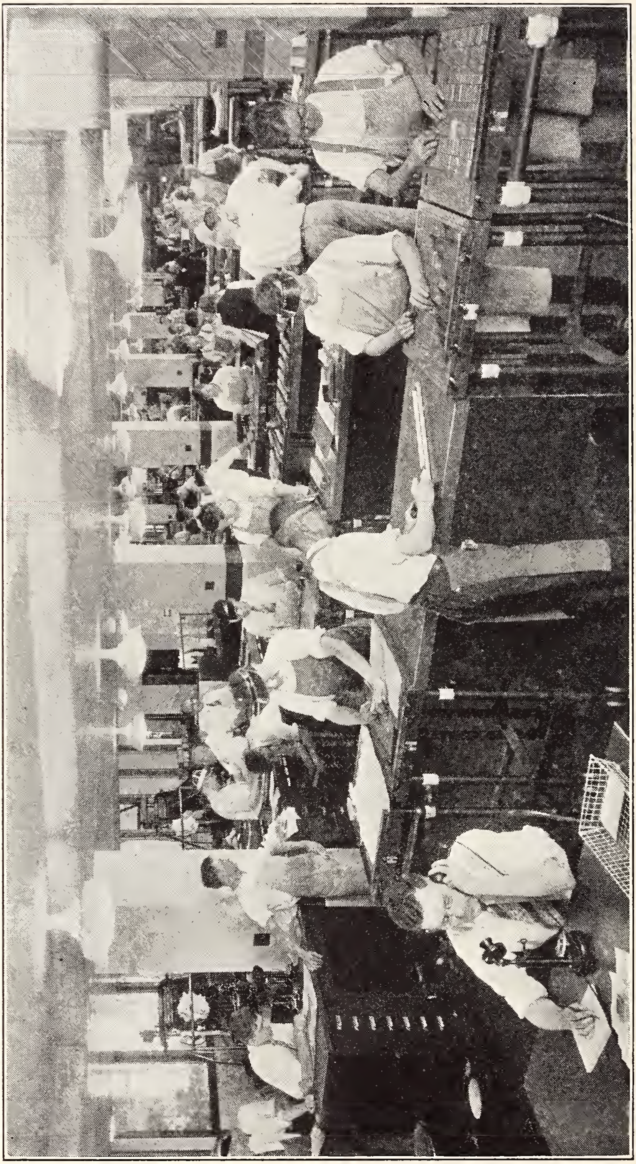
Working Conditions.—As we went from one workroom to another to see the compositor, the pressman, the bindery workers, the stereotyper, the electrotyper, the photo-engraver, and the lithographer at their daily tasks, we mentioned from time to time some of the dusts, fumes, and other conditions which surround them at work. We shall not list these all over again; we shall only remind ourselves that they exist. We shall want to remember that up-to-date employers in modern plants have installed exhausts on the machines or in the rooms, have modern ventilating systems and use modern methods of suction cleaning instead of the old broom method which raises the dust. In these plants the conditions which affect the general health and the lungs of the workers are so improved that there is little danger. In years past the workers in the printing industry were apt to have tuberculosis and lead poisoning. A report[16] made in 1927 on the health conditions in the printing trades, states that although it was impossible to give each man a physical examination, all the returns from employers and employees showed that tuberculosis was "no longer a menace of serious proportions" and that there were fewer cases of lead poisoning than had been expected. More recent reports[17] show a decline in deaths caused by pulmonary tuberculosis although some state that this is not so rapid as for the rest of the population. Only in a rare instance is a death caused by lead poisoning.

Not only is it necessary that the plants be properly equipped by the employer to reduce the dangers, but it is equally important that the worker knows what the dangers are, uses the devices provided by the employer, and protects not only himself but his fellow workers. One of the investigators for the United States government found on several visits to a certain establishment, that a jug containing a poison was uncorked each time, although the label on the jug especially asked the workman to replace the top. This is but one of many examples which might be used to show the need for the worker to guard his own health and that of others.

The skin of some persons is irritated by chemicals. When this is true, sometimes the only remedy is for the workman to shift to another occupation in the trade where the irritating chemical is not used.

As we have gone through the workrooms, we have noticed also the use of various machines. Up-to-date employers equip these machines so far as possible with guards to the knives, saw, and other dangerous parts. Inventors have not yet perfected all the guarding devices so that still much care must be taken by the workers themselves in order that fingers may not be cut or crushed.

Some printing establishments, like other types of establishments, are being moved from the crowded business center in the heart of cities to the outlying districts or suburbs where there is more light and more air. The workrooms in which the employees especially need light are being placed where they can get it as are also their work benches and machines. More and more attention, also, is being given to the placing and shading of artificial lights. The question of proper lighting is a particularly important one in the printing trades. The report on health conditions, quoted before,[16] states that "the conservation of eyesight in the printing trades is....one of the most pressing needs of the present situation." Yet,



Courtesy of Chicago Daily News

AN UP-TO-DATE COMPOSING ROOM, SHOWING THE USE OF SEMI-INDIRECT LIGHTING ten years after this report,[18] a committee of the Illuminating Engineering Society found that the old-fashioned, cone-shaded lights on drop cords still prevailed.

Thus, all plants are not modern and where they are not, these workers who are producing books, magazines, and newspapers for us to enjoy, are living during their working day in some danger and under considerable hardship.

Hours of Work.—The men and women in union shops of the printing industry today work eight hours a day or less and frequently a five-day week with the result that generally they work a week of 40 hours or less.[19] With time added for going to and from work (in the large cities this may amount to from one to two hours or even longer), with time added for meals and for sleeping, there remain some leisure hours which the worker may use as he sees fit.

The printing trades have not always had these hours and today some nonunion establishments require their employees to work over eight hours. A shortening of the work day for both union and nonunion workers has been taking place during the last twenty-five years. The census of 1920 [20] reports that in 1914, 68.6 per cent of the wage earners in the printing industry (skilled and unskilled, union and nonunion) worked 48 hours or less and that by 1919 the percentage had increased to 86.8. The census of 1930 [21] showed that the percentage of all wage earners in the printing industry working 48 hours or less a week had increased to 92.7.

Regularity of Employment.—Whether a man or woman works regularly and thus receives a steady income, is very important not only to himself but to those dependent upon him. When a man or woman returns to his home at night with the news that the job he has been working on is finished and that he has been laid off indefinitely, anxiety (and sometimes terror) is not only in his own heart but in the hearts of all those who depend upon him for food and shelter. Most of the men, especially in the skilled occupations of the printing trades, are more fortunate than many workers, for they are kept at work rather continuously throughout the year, except in periods of national depressions such as we had shortly after the war and have been going through in the nineteen thirties. The newspapers are printed in the summer as well as in the winter months. In many job shops a slack period occurs, however, during the summer months.

The census of manufactures gathers figures from employers, which tell us the lowest percentage of workers employed during the year. The figures from the census of manufactures for 1935 [22] showed that in the book, job, and music branch of the printing industry, the lowest number of workers employed during the year was 94.2 per cent of the largest number employed; in the newspaper branch it was 95.8 per cent.

In 1930 the unemployed workers were counted as well as the total number of persons living in the United States. Two classes of unemployed were made: Class A, persons out of a job, able to work and looking for a job; and Class B, persons, having jobs but on lay off without pay, excluding those who were sick or voluntarily idle. In the printing, publishing, and engraving industry 4.0 per cent of the workers were listed in Class A; in the baking industry, 5.5 per cent of the workers were in Class A; and in the building trades 15.4 per cent of the workers were in this same class of unemployed.[23] From a comparison of these three groups of workers, it will be seen that there were fewer unemployed in the printing industry than in the baking industry even, which manufactures a necessity.

Perhaps the women bindery workers have the greatest amount of unemployment. Generally an employer keeps a certain number of regular workers. When a large order comes in, he may increase the number of employees by taking on many women who do the unskilled work and so do not need much training. When the job is completed these workers are laid off and either have to wait until they are called again or seek temporary work in other printing establishments or other trades. Some workers, of course, use their periods of unemployment for studying and in that way train themselves for more skilled work. This expansion of the working force is, of course, only possible where the workers are unskilled or semi-skilled. Because of the new program of unemployment insurance, it is believed that there will be less of this practice than formerly.

Wages.—Besides hours and seasons which affect the whole life of the worker and the lives of those whom they support, there is another factor, perhaps the most important of all, which we have not mentioned, that of wages. America prides herself on the belief that her workers have a wage sufficient to feed, clothe, and shelter the worker and his family, with a margin for recreation and further education, at a standard called the American standard of living. If we look around us, we begin to see that this statement is not always true. Fortunately for many of the skilled men and women in the printing trades, especially for those working in union shops, sufficient wages are paid so that the workers are able to provide for themselves and their families at this American standard. Wages of skilled workers or journeymen vary somewhat from trade to trade and from locality to locality. For union shops, wage scales are usually printed in pamphlet form so that each person may know what the agreed scale is. The United States government also prints these wage scales from time to time. In nonunion or open shops the employer deals with each employee separately and so it is difficult to know what is paid each person. The Research Bureau of the employers' organization known as the United Typothetae of America publishes wage scales sent in by some employers.

Table IV is a simple table, taken from a report of the United States government,[24] which gives the minimum union wage scales for many other cities besides those given here. In this table one can find many interesting facts, only some of which we shall point out. Bindery women are the lowest paid of all workers, their wages varying from 40 cents an hour in New Orleans to 67.5 cents an hour in New York City. Press assistants and feeders, as one would expect, receive less than the pressmen. In New York and Chicago the compositor, who works on the day shift in newspaper establishments, is one of the highest paid workers of those given. A comparison can also be made between the cities, one located in each section of the country, the East, the West, the Middle West, and the South. Wages in New Orleans are considerably lower than in New York, Chicago, or Los Angeles. New York on the whole has the highest wages of all; Chicago, next; and Los Angeles, third.

TABLE IV

Hourly Rate of Wages for Union Workers in Certain of the Printing Trades, in Four Large Cities, May 15, 1936.

Note: The length of the week for these workers ranges from 32 to 44 hours. Statistics for lithographers were not given.

Occupation	New York	Chicago	New Orleans	Los Angeles
	Dollars	Dollars	Dollars	Dollars
Compositors, Hand—Book and Job	1.075-1.438	1.225	.900	1.069
Compositors, Hand—Newspaper, Day	.875-2.000	1.000-1.883	not given	1.178
Pressmen, Cylinder—Book and Job	1.223-1.540	1.068-1.420	.888	1.050-1.250
Pressmen, Platen—Book and Job	1.131-1.313	1.000-1.159	.813	.975
Pressmen, Web—Newspaper, Day	1.240-1.427	1.100-1.267	.750-.813	1.067-1.133
Press Assistants and Feeders, Book and Job	.682-1.159	.615-1.131	.440-.688	.675- .825
Bindery Women—Book and Job	.500- .675	.534- .568	.400	.500
Bookbinders — Book and Job	.738-1.250	.818-1.136	.938	1.050
Electrotypers — Book and Job	1.500	1.500	1.000	not given
Stereotypers — Newspaper, Day	1.233	1.083-1.286	.750	1.067
Photo - engravers — Book and Job	1.750	1.400-1.438	1.250	1.250

Since wages in open and nonunion shops are set by each employer with each employee, it is difficult to tell what wages are generally paid. Some open shop employers co-operate with the Bureau of Research of their own organization, known as the United Typothetae of America, by sending in their wage scales. These figures are published at frequent intervals.

TABLE V

Hourly Wage Scales of Workers in Open Shops in Certain of the Printing Trades in Four Large Cities, October 20, 1937

Note: The length of the week ranged from 40 to 41.3 hours.

Occupation (Book and Job)	New York	Detroit	New Orleans	Sacramento
	Dollars	Dollars	Dollars	Dollars
Compositors	1.20	.946	.82	1.30
Compositor—Machine Operator	1.20	1.019	.82	1.30
Proofreaders	1.125	.910	.711	1.30
Job Pressmen	.90	.779	.66	1.20
Cylinder Pressmen	1.20	.956	.82	1.275
Job Feeders	.60	.561	.44	.687
Cylinder Feeders	.90	.679	.55	.925
Rotary Pressmen	not given	1.150	not given	1.425
Rotary Assistants	not given	.733	not given	1.275
Men Binders	.905	.705	.82	1.275
Cutters	.905	.835	.66	1.275
Rulers	not given	.897	.82	1.275
Bindery Girls	.465	.432	.37	.625

Table V has been made from the facts given in one of these reports.[25] Because open shop figures were not given for Chicago and Los Angeles, two cities listed in Table IV (p. 100), Detroit and Sacramento have been included to represent a mid-western and a western city.

Many, many comparisons can be made between the facts contained in Table IV and Table V, showing the wages of the various workers in union and open shops. The union figures are for May 1936 and those for the open shop, for October

1937. However, union figures for May 1937, not given for individual cities, indicates that there had been a slight increase in the average union rates per hour from 1936 to 1937.[26] As a result the difference between union and open shop figures would be greater than indicated here with the difference in favor of the union rates. Union compositors in New Orleans received 90 cents an hour and compositors in open shops, 82 cents. In New York cylinder pressmen received from 1.223-1.540 dollars an hour in union shops and in open shops they received 1.20 dollars an hour on the average. Bindery women, the lowest paid group of workers, received 40 cents an hour in union shops in New Orleans and 37 cents an hour in open shops in the same city.

The actual earnings for a year or of a lifetime, of course, are the figures which should be considered when one is questioning whether a worker and his family have enough to live on. Unfortunately we have very few facts concerning yearly earnings. If we did have them, however, it would be necessary to consider them alongside the amount it costs a family to live according to the American standard of living. This varies from city to city and from year to year as the prices of food, clothing, and rents go up and down.

With these general facts in mind we must recall that nonunion workers on the whole do not receive as much as union workers and that a union press feeder or a union bindery woman does not receive as much as a union compositor. Thus while wage scales and yearly earnings of this group of skilled workers compare favorably with those of other workers, yet some workers even in the printing trades do not receive enough to maintain a family of five at the American standard of living.

How the Workers and Employers in the Printing Trades Co-operate

Mention was made in some of the previous paragraphs of employers' organizations, employees' organizations, union and nonunion or open shops. Perhaps at the time we should have stopped to explain the meanings of these terms more fully but the question of employee and employer organizations, how these organizations work together and with what results to the worker, to the employer, to the industry, and to the public, requires more than a sentence or two.

EMPLOYERS' ORGANIZATIONS.—Employers organize to protect their interests; to deal with groups of workmen; to improve the industry by developing better technical processes and better methods of estimating costs and selling the products. Some are concerned with the training of the workers for and in the trades. Most employers belong to at least one organization. Although the United States government through recent legislation has encouraged employees to organize and to deal with their employers, all have not done so. As a result there are still two groups of employers: those who do not work with an employees' organization (these employers are said to run non-union or open shops); and those who work with employees' organizations either as individual employers or through employers' organizations (these employers are said to run union shops).

Employers who organize usually have organizations for the various branches of the industry. For example, the newspapers, especially the large ones of a big city, join together into local branches of the American Newspaper Publishers' Association. The book and job employers join a separate organization, a branch of the United Typothetae of America, one of the oldest organizations of employers in the United States. The branches are called by various names; for example, the one in New York City is called the New York Employing Printers' Association and the one in Cincinnati, the Franklin Typothetae.

We do not need to remember the names of all the employers' organizations but we do want to know what they are for and where we can find them. Sometime we may want to obtain from them certain information about wages, hours, or apprenticeship regulations.*

---

*See Appendix II, page 144, for list.

EMPLOYEES' ORGANIZATIONS.—Employees join together into organizations called trade unions to protect their interests, to improve wages, hours, working conditions, and in the case of the printing trades, to regulate apprenticeship or the training of young workers on the job.* All empolyees are not organized but there is an organization for each kind of employee in the printing trades. Some may not care to join and others may be in small towns where there are too few workers in the printing trades to form a local organization. The employees organize by trades. There are national organizations for each trade and in the cities the workers in the various printing trades form separate locals, usually given a number. For example, the national organization of the compositors is called the International Typographical Union and the local for compositors in New Orleans is called Typographical Union, No. 17. For the pressmen the International Printing Pressmen and Assistants' Union is the national organization; the locals in New York are New York Printing Pressmen's Union, No. 51, and New York Newspaper Pressmen's Union, No. 2.

The international organizations of five of the printing trades, the compositors, the pressmen, the stereotypers and electrotypers, and the photo-engravers are united in an organization called the International Allied Printing Trades Association, whose main purpose is to license through the local councils in the various cities, the union shops and to furnish them with the union label for their shops. The city organization of the five trade unions is generally called the Allied Printing Trades Council. Each shop that obtains the right to the use of the label is numbered and has the label and the number printed on the pamphlets, books, or paper which it produces. From time to time we may discover such a label printed in the corner of some pamphlet or book which we are reading. In addition to licensing printing shops so that they may use the union label, the Allied Printing Trades Councils help, by moral suasion and not by strike, an individual trade union when it is trying to reach an agreement as to wages or hours with some employer.

---

*Some of the trade unions in the printing trades carry on other activities. Homes for sick or aged members are provided, such as the Pressmen's Home, in Tennessee; the Costello Tubercular Home for Stereotypers, Denver, Colorado; the Union Printers Home for the International Typographical Union, Colorado Springs, Colorado. Two unions, the International Typographical Union and the Printing Pressmen and Assistants' Union, provide old age pensions as well as homes for their aged members. All unions in the printing trades have some form of death benefit. Some locals in several of the international unions pay their members when they are unemployed or when they are too sick to work.[27]

Just as in the case of employers' organizations, we do not want to remember exactly the names of all the employees' organizations but we do want to know how to locate the national offices and the local offices from which we can get up-to-date local information on wages, hours, and regulations of the apprenticeship by means of which the young workers are trained for the trade.*

EXTENT OF EMPLOYEE ORGANIZATION.—The printing industry is more highly organized so far as the employees are concerned than some other industries. Since we have spoken about union wages and union hours, it will be of interest to see exactly how many men and women are affected in the industry. The number affected will always be considerably larger than the number of men and women paying dues into the union

TABLE VI

Number of Union Members in Various Printing Trades from 1920 to 1936

Occupation	Number of Union Members			
	1920	1928	1932	1936
Bookbinders	20,700	13,800	11,900	11,600
Lithographers	6,100	6,100	5,600	6,900
Photo-engravers	5,900	8,300	8,900	8,800
Plate Printers	1,400	1,200	1,100	1,300
Printing Pressmen	35,000	40,000	40,000	32,000
Stereotypers and Electrotypers	5,900	7,400	8,100	8,100
Compositors	70,000	75,800	76,100	73,300

*See Appendix II, page 144.

treasury. Open shop employers can not employ men and women at very much lower wages or much longer hours in the same community where there are many union shops, because if they tried to they could not get the best trained men and women to work for them. Table VI[28] shows the number of paid-up members in the various printing trades for certain years from 1920 to 1936.

RESULTS OF ORGANIZATION.—Both employers and employees have long been organized. Some of them worked together for many years before the federal government fostered this type of co-operation through the National Recovery Administration (N.R.A.) and more recently through the National Labor Relations legislation. The United Typothetae, the organization of the employers in the book and job branch of the industry, was founded in 1887 and has existed continuously since that time. The International Typographical Union, which originally included all workers in the printing trades, was founded in 1852 before the job of compositor had been broken up into the many trades as it is today. An early association of printing employees was formed in New York in 1776 and 1786; the roots of such an employees' organization are to be found in England where the shop organization was known as the chapel.

The employers through their organizations and the employees through theirs, meet together to determine wages and hours in the trades and to make regulations which govern apprenticeship or the training of young workers on the job. This is known as collective bargaining. Frequently, as we have mentioned before, these agreements are printed in pamphlet form and distributed among the workers and employers. Wages and hours we have already considered. The regulations for apprenticeship are so important and so varied that we shall discuss them at some length in the next chapter.

An educational program for the industry, whereby young workers are trained and a supply of skilled journeymen is provided, is one of the outstanding results of employer and employee co-operation. The employers and the employees in the commercial and periodical branch of the industry united in 1921 in a plan of co-operation on a national scale, which for several years (until 1925) had a council called the International Joint Conference Council. This body was particularly interested in the working conditions of the industry and co-operated with the Department of Labor of the United States government to find out the conditions in the industry and the remedies necessary to improve conditions.[29] As a result of representatives of employers' and employees' organizations sitting around a table to talk over wages, hours, and grievances, most differences have been ironed out, and it is rare that we hear of a strike today in the printing industry.

Some Questions to Answer and Problems to Solve

Chapter VII

1. Table II (p. 90) gives the relative number of workers in the various printing trades for 1910, 1920, and 1930. From this table, answer the following questions:
    (a) Has the relative number of apprentices been increasing or decreasing?
    (b) In what two occupations are the largest numbers of workers found?
    (c) In what occupation is the smallest number of workers found?
2. Table III (p. 91) gives the relative number of men and women in the various occupations in the printing trades. After studying the table, answer the following questions:
    (a) In what occupation are there no women at all?
    (b) In what occupation is the largest number of women found?
3. Make a list of all occupations where young men and women are employed.
4. If a person desires to look up the wages of men and women in the printing trades, to what two sources may he go for information?
5. Tables IV (p. 100) and V (p. 101) give us facts about the wages of men and women in the various printing trades. Select one city in one of the tables and rearrange the hourly wage rates paid to workers in each of the printing trades, placing the group of workers receiving the highest rate with the rate they are paid at the top and continuing down to the lowest paid workers with their rate at the bottom.
6. Explain the meaning of the words and phrases listed below:
    seasonal
    suction cleaning
    fly boy
    International Allied Printing Trades Council
    union label
    unemployment insurance
    National Recovery Act (N.R.A.)
7. In the printing industry various groups of employers and employees form organizations. List three reasons why employers organize and three why employees organize.
8. Point out some of the good resulting from employers and employees working together.
9. Make a list of all the factors in the work life of men and women in the printing trades that are important to them.
10. Try to locate either an employers' or employees' organization in your locality by referring to the classified telephone directory, city directory, or some employer or worker who might give you the information.

CHAPTER VIII

Apprenticeship: How Young People Are Trained on the Job

Young people are trained for an occupation either in school or on the job, or by a combination of both. When the training on the job is organized in a systematic way and extends over a period of two to five or six years, the method of training is called apprenticeship. Apprenticeship is the recognized way of learning the skilled trades in the printing industry, supplemented more and more by school instruction, related closely to the work on the job.

Apprenticeship Varies From Shop to Shop, and From Trade to Trade

In the last chapter we found that there were union shops in which the employers and employees, through their organizations, work out, among other things, plans for apprenticeship. We also saw that there were nonunion shops, in which the employers did not work in this manner with their employees.

In many of the nonunion shops, the training of the young workers is left to no one in particular and is done, therefore, in a hit or miss fashion. In a few other nonunion shops, a special man is sometimes hired, who supervises the apprentices. In these shops the training is planned and properly supervised. The nonunion or open-shop employers, who organize, may have a city-wide plan for training apprentices.

Apprenticeship training, therefore, varies greatly from the shop where no one in particular is in charge to an occasional shop where a supervisor of apprentices is hired, or to the shop operating under the well-worked-out plan, agreed to by employer and employee organizations. These organizations may have control over one trade in all shops in one city, or in the case of some of the national organizations which set standards for the entire trade in the United States. It is impossible to discuss in detail the apprenticeship training in every shop in the United States and for each of the printing trades. Each nonunion shop would be entirely different from the other; each union shop might have slight variations in the actual application of the rules agreed to by the employer and employee organizations; and training for each of the printing trades would vary. Regulations, too, are changed from time to time.

At some future time there may be a national minimum standard for apprenticeship in the printing trades worked out as there has been for the painting and plumbing trades. Recently the Federal Committee on Apprentice Training was made a permanent part of the U. S. Department of Labor to "promote a better national understanding of apprenticeship standards; and to develop and recommend minimum standards of apprenticeship for various trades."[30]

How Boys and Girls May Find Out About Apprenticeship for Themselves

What we can do is to discuss, in general, apprenticeship in union print shops to see what regulations are made and what a good apprenticeship scheme includes. With this information we can, at any time, if we so desire, look up apprenticeship conditions in any shop in any particular city. We shall want to find out whether the shop is nonunion or union. If nonunion we may visit the plant and ask the superintendent of the plant a number of questions.* We can soon see whether or not there is any plan of training in that establishment. If the establishment is union, we may hunt up the local branch of the employers' or employees' organization for the particular trade in the classified telephone directory under "Labor Organizations" or "Associations." If they can not be located in this way, we may write to the national office,* asking for the exact name of the secretary of the city local. On a visit to the secretary we could find out the union shops in the city and obtain, if printed, a copy of the Apprenticeship Rules, and perhaps the name of a man or two on the Apprenticeship Committee, who help supervise the apprentices. By reading the pamphlet on Apprenticeship with certain questions in mind,† we may answer the questions ourselves and find out exactly the regulations for the particular trade in which we are interested, in our particular city.

---

*See Appendix III, page 146, for a set of questions to be asked.

There is no reason why boys and girls can not begin to do simple pieces of original research as well as grown persons. They must know exactly what they want and how to go about getting it. They must be very, very accurate in reporting what they find, and extremely courteous and always patient in asking for information from busy men and women.

Regulations of Apprenticeship

We said a few moments ago that we would discuss some of the general regulations of apprenticeship. These will help us understand what is happening in the printing trades, and will give us the background necessary to investigate local regulations should we want to look them up.

LIMITATION OF NUMBER OF APPRENTICES.—The boy or girl who plans to learn one of the printing trades files his application in some cases with the employer of the establishment and in other cases with the Joint Apprenticeship Committee or a Committee on Apprenticeship of the local union. Generally the name of the young person has to be on the waiting list, for the positions are sought after, leading as they do into jobs filled by the skilled men or journeymen. The number of apprentices is limited by two conditions. First, the unions desire to limit the number of apprentices so as not to have an oversupply of skilled workers, thus having some men unemployed. They usually insist that the number of apprentices be limited in the agreement. This number varies. Sometimes it is one to every three journeymen, or one to every six, and, in some instances, one to every fifteen journeymen. Second, the employers do not always hire the full quota of apprentices allowed by the agreement. This is because it is expensive for an employer to train an apprentice and some employers do not want to be bothered with the training of young workers if they can hire skilled men. So the young person may wait some time on the list for an opening.

---

*See Appendix II, page 144.

†See Appendix III, page 147.

ENTRANCE REQUIREMENTS.—All young persons are not accepted, for the regulations usually make certain entrance requirements as to age, education, physical condition, and general qualities. Usually no one under sixteen years of age is accepted. Some printing trades require boys to be still older. For example, the stereotypers want their apprentices to be from eighteen to twenty-six years of age, and the electrotypers take them up to thirty years of age. Almost every one of the printing trades requires the young person to have an eighth grade education. Boys interested in the trades are applying with more and more education so that today young people with one, two, or even four years of high school may be found as apprentices learning the trades. A number of agreements require the would-be apprentice to have a physical examination before being accepted. Other agreements require the applicants to be of "good moral character." The International Typographical Union requires its locals to have the apprentices under its jurisdiction given a physical examination by a physician and an examination in grammar and English by one of its officers.

As we have seen in the sections on qualifications in the chapters dealing with the compositor, pressman, bindery worker, stereotyper and electrotyper, photo-engraver, and lithographer, some employers and schools are beginning to use all the recognized means of selecting workers for their jobs, namely, physical examinations; school records, including rank in school; interviews; home visits; and standarized tests of general intelligence, interests, artistic ability, mechanical ability, and personality.

LENGTH OF APPRENTICESHIP AND ASSIGNMENT TO DUTIES. After an applicant has been accepted as an apprentice, he makes an oral or written contract with the employer, stating that he will continue his training throughout the period, and the employer in turn promises to furnish the training. Sometimes the father of the apprentice is also required to sign the contract, since the apprentice is a minor. In many of the agreements there is a probationary period of six months during which time the apprentice is tried out.

The length of apprenticeship varies. For most of the printing trades it is four, five, or even six years. In the case of girls in parts of the bindery trade the apprenticeship is but one year in length. During this time the agreements frequently state specifically the training to be given each year. The regulations for the apprentice in training to be a compositor are perhaps the most detailed. The rules governing compositor apprentices in book and job shops in New York City are as follows:[31]

> "No office shall be entitled to employ an apprentice unless it has the equipment necessary to enable proper instruction being given the apprentice in the several classes of work to be taught each year as agreed upon in this contract. No apprentice shall be permitted to work on the third (lobster) shift.
>
> "In the first year an apprentice shall be required to perform general work in the composing room at the discretion of the foreman at any work which he may be deemed capable of doing. He shall serve a term of not less than three nor more than six months of the first year as copyholder and assistant proofreader, but shall not do first reading.
>
> "In the second year an apprentice shall be employed at least seventy-five per cent of his time at *hand* composition and distribution. He shall be given opportunity to set reprint ads and job work.
>
> "In the third and fourth years an apprentice shall be employed at least fifty per cent of his time on the floor at hand composition and distribution. He shall be given opportunity to set ads and job work from manuscript, and assist on make-up and imposition.
>
> "In the fifth year an apprentice shall be employed at least seven hours each day at hand composition, distribution, make-up, and stone work.

> "In the sixth year, an apprentice shall be employed the first half of the year at hand composition, distribution, make-up and stone work; in the second half of the sixth year, if the apprentice has selected machine training, he shall be instructed and set live matter for his full time on any typesetting (Linotype or Intertype) or typecasting (Monotype keyboard) machine, in the office where he is employed."

ADDITIONAL TRAINING REQUIRED.—Sometimes apprentices are required to get additional training in schools managed by employer and employee organizations, or by manufacturers of machines, or in public night schools. Some trades require the apprentice to take correspondence courses. For example, apprentice compositors are required to study lessons furnished through the International Typographical Union and pressfeeders who want to prepare themselves for pressmen's work must take a correspondence course, furnished by the International Printing Pressmen and Assistants' Union of North America, which also maintains a trade school at Pressmen's Home, Tennessee. The question of schools and their relation to apprenticeship we shall discuss much more fully in the next chapter.

During the period of apprenticeship some committees test the apprentices at intervals to see that they are getting the proper training. During the rush of the day's work it is so easy to keep the apprentice running errands instead of making it possible for him to learn a difficult task under the direction of a journeyman who is hurrying to get out a piece of work, that these examinations are necessary.

WAGES AND HOURS.—Another very important matter that is regulated in agreements is that of wages for apprentices. The unions and employers agree what the journeymen in the various printing trades shall receive for a week of a stated number of hours. As we have seen, these vary. So also do those of the apprentices. Generally the agreements state that an apprentice shall receive a certain per cent of the journeyman's wage for the first year, a certain higher per cent for the second year, and so on until gradually he approaches the journeyman's wage. Sometimes the increases come at periods of six months instead of a year. For example, the wages[32] of the apprentices in the composing room of the book and job establishments in New York City are as follows:

First Year	30% of Journeyman's rate
Second Year	40% of Journeyman's rate
Third Year	45% of Journeyman's rate
Fourth Year	50% of Journeyman's rate
Fifth Year	60% of Journeyman's rate
Sixth Year	75% of Journeyman's rate

GRADUATION OF THE APPRENTICE.—As the apprentice completes his training period, various ceremonies take place. This is usually the time when he is initiated into the union. In the case of the printing trades the initiation fee is not large. This is the time when the apprentice formally becomes a journeyman in the trade, one of that great body of skilled workmen, who, we said at the beginning, are preparing the books, magazines, newspapers for us to enjoy.

Some Questions to Answer and Problems to Solve

Chapter VIII

1. State in your own words the meaning of the following terms:

apprenticeship	journeyman
over supply of workers	trade union agreement
correspondence course	probationary period

2. Apprenticeship varies from trade to trade and to a certain extent from locality to locality. In order to begin your investigation of local apprenticeship conditions, how would you find out first where apprentices work in your community? Explain in detail.

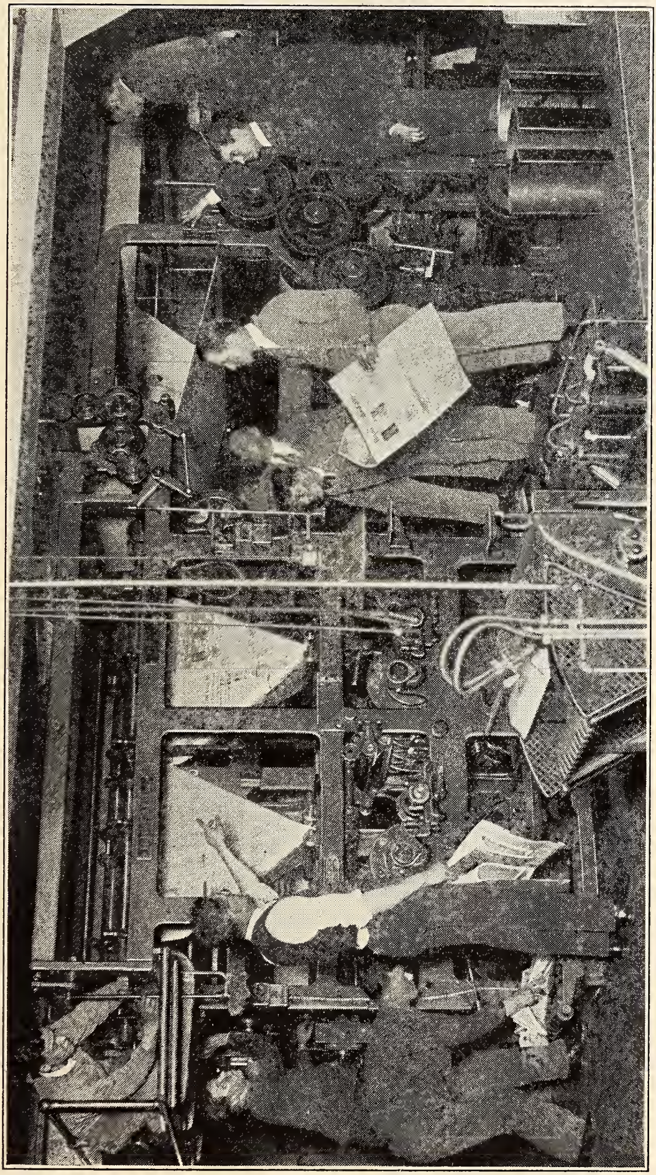
3. Appendix III (p. 146) contains a questionnaire which can be used when visiting a printing establishment where apprentices work. Because employers can not be interrupted too many times by young people, plans should be laid carefully before the visit is made. The following steps should be taken:
   (a) A survey should be made of the resources of the class members to find out whether some relative owns a printing shop or is a worker in a printing establishment.
   (b) A small committee should be selected to make the visit.
   (c) The items in the questionnaire should be discussed in detail by all the class and a final questionnaire drawn up, which will include any suggestions made and approved by members of the class.
   (d) After the visit is made the committee should write up a report and discuss their findings with the class.

4. The second questionnaire in Appendix III (p. 147) is to be used in gathering information from a union official. The same procedure should be used as that suggested above under Problem 3.

5. Trade unions generally limit the number of apprentices. Why do they do this?

6. Make a lisit of all the qualifications an apprentice must have to be accepted.

7. Apprentices learn while working through instructions given them by foremen and other workers. What other helps does the apprentice have in learning his trade?



Courtesy of New York Employing Printers' Association

CLASS IN MAINTENANCE AND OPERATION OF HOE NEWSPAPER PRESS

School for Newspaper Pressmen, The New York School of Printing, New York City

CHAPTER IX

Schools and Their Relation to Apprenticeship

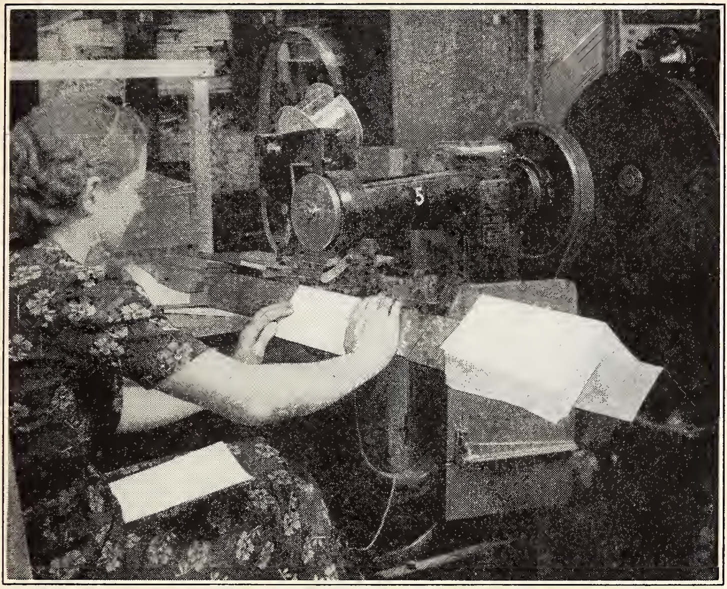
The question may arise in the minds of the boys and girls when they have read the previous chapter, why, if apprenticeship is the way in which to learn the printing trades, do so many schools exist today, which teach printing. This is a very sensible question and one which we shall attempt to answer by looking at the various kinds of schools in which printing is taught, one after another.

Printing Courses in Regular Schools

To most boys and girls the print shop in the regular elementary schools or perhaps high schools is very familiar. They may not have worked in the shop themselves but they have passed by the door, have seen their friends at work, and have read the school paper which has been printed in it.

These courses in printing, with but few exceptions, are not planned to train young persons for the trades. They are put into the regular school courses for various reasons: (1) to develop the use of the hands and fingers; (2) to give to the pupils an understanding of machines and materials used; (3) to give them an appreciation of printing as a fine art and the skill needed in it; and perhaps (4) to offer them an opportunity "to try out" their interest and aptitudes to see whether or not they like the work well enough to enter later upon the long period of training necessary to become skilled journeymen.

These school printing courses are increasing in number. In 1912 there were fifty-seven school printing plants in the United



Courtesy of Frank Wiggins Trade School, Los Angeles, California

Student operating stapling machine, Bindery Department, Frank Wiggins Trade School, Los Angeles, California.

States. Today the number of printing classes and schools has reached between two and three thousand. This growth has been partly if not largely due to the work done by the Educational Department of the United Typothetae itself, which has worked very closely with employer groups and schools all over the United States, and more recently to the efforts of the National Graphic Arts Education Guild.

Vocational Schools

While the courses in the regular schools and especially the junior high schools are not designed to train for the printing trades, there are a few public and private vocational schools with special, practical courses intended to do so. These schools take young persons who are not yet apprenticed and give them part of their training before they enter the trades. They are located in various places in the United States. Some of the private and public schools organized to train young persons in the printing trades are: the New York School of

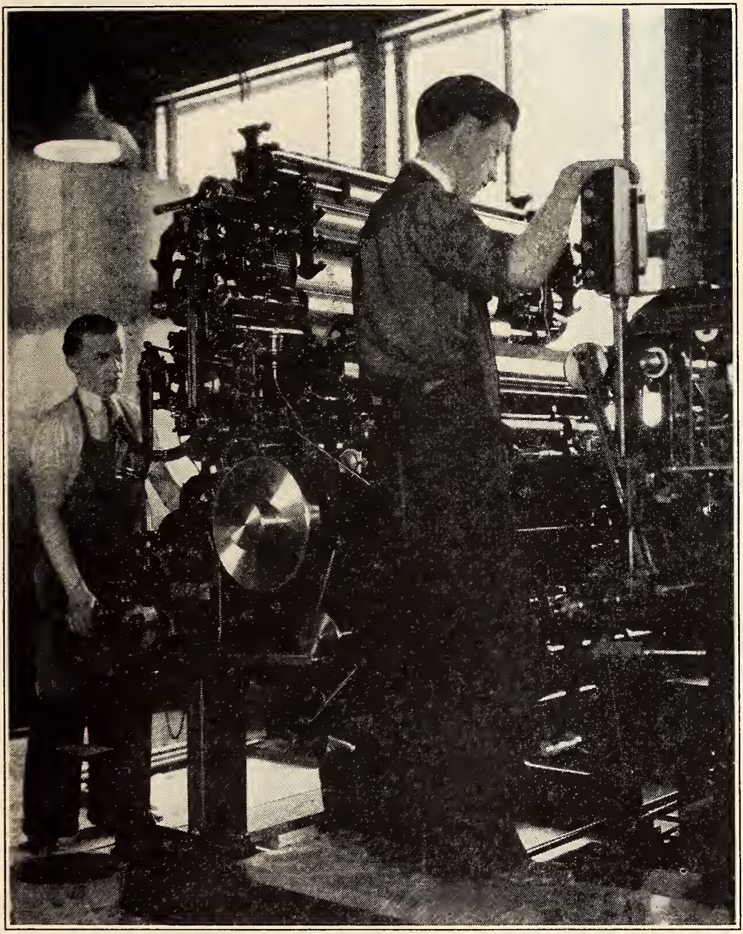
Courtesy of Burgard Vocational High School, Buffalo, N. Y.

Students cleaning out originals made on lithographic stones prior to making a transfer on an aluminum plate for printing on an offset press, Burgard Vocational High School, Buffalo, N. Y.

Printing; the Frank Wiggins Trade School of Los Angeles; Wentworth Institute of Boston; the Dunwoody Industrial Institute of Minneapolis; Delgado Trades School of New Orleans; Cass Technical High School of Detroit; Printing Vocational High School of Cincinnati; the Ottmar Mergenthaler School of Printing, Baltimore; Burgard Vocational High School, Buffalo; the Central Trade School of Oakland, California, and South Bend Vocational School, South Bend, Indiana. A few schools train girls as well as boys, such as the Miller Vocational High School of Minneapolis. One school gives training in printing to girls exclusively, the David Hale Fanning Trade School for Girls, Worcester, Massachusetts.

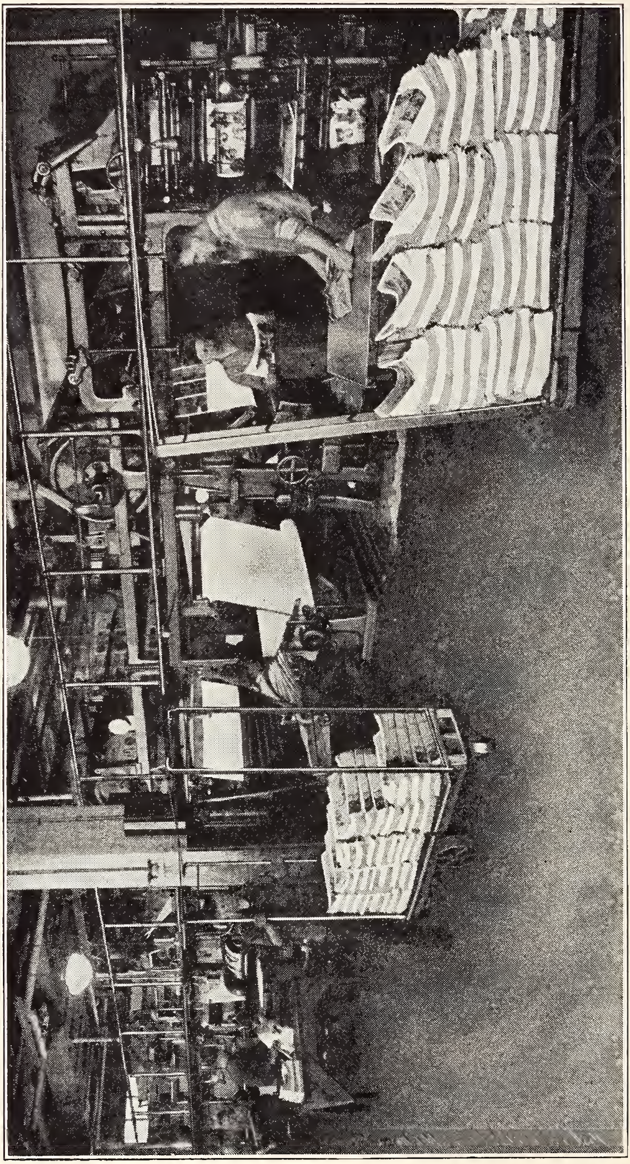
The Wentworth Institute, School of Mechanics, of Boston, is a private school endowed by Arioch Wentworth, who was himself a successful mechanic. In it are taught other trades besides those of printing. Applicants for admission to the one-year course "should be over seventeen years of age and thoroughly in earnest." Besides the two-year course for day pupils, evening classes are offered for apprentices working at the trade during the day. The annual tuition is $150.

The Ottmar Mergenthaler School of Printing, Baltimore, is part of the public school system. Therefore, tuition is not



Courtesy of Burgard Vocational High School, Buffalo, N. Y.

Students operating a lithographic, single color, offset press, Burgard Vocational High School, Buffalo, N. Y.

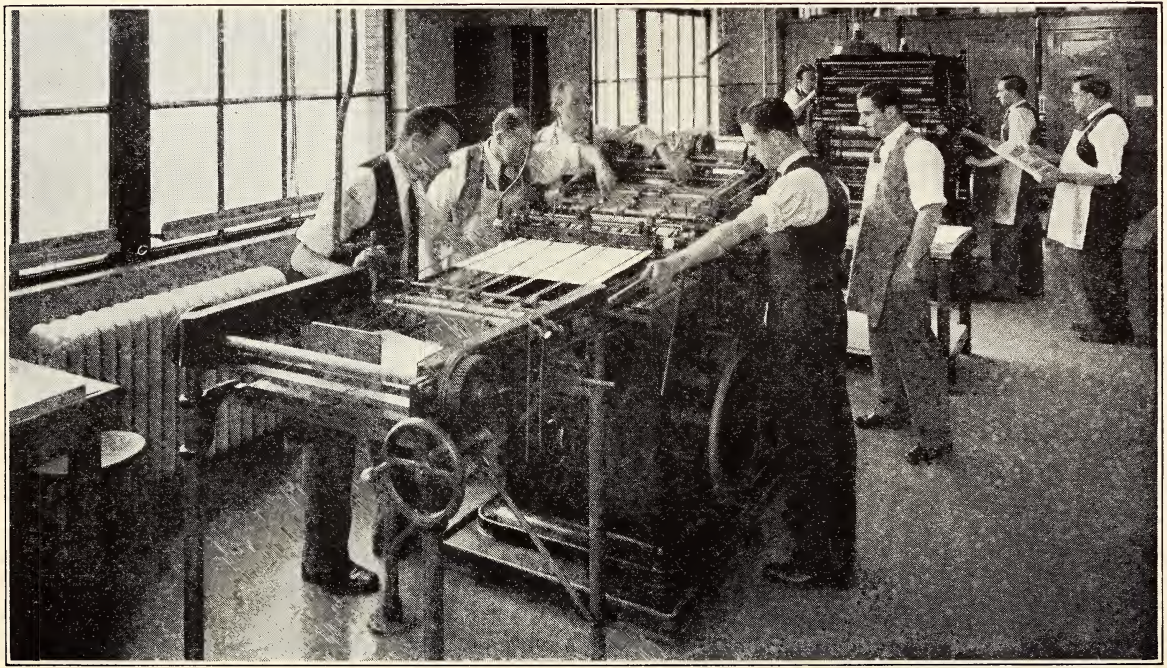


ROTOGRAVURE PRESSROOM

charged to those who are residents of Baltimore. Boys must be fourteen years of age or over and must have completed the eighth grade before entering. Tests designed to determine aptitudes for the various branches of the trade are given the applicants before admission. The course includes training in composition, presswork, and photo-lithography and lasts for three years of eleven months each. A special course also three years in length is given in photo-lithography.

The Printing Vocational High School, Cincinnati, is also a school operated by the Board of Education. Residents of Cincinnati are not charged tuition. The school gives instruction in hand and machine composition, plate and cylinder presswork, offset lithography, photography, and commercial art. Boys are accepted who are fourteen years of age or older. Adult workers in the trade may attend school at night. Four years' work is condensed into two years through a forty-eight-week school year and a somewhat longer school day and students who graduate receive a four-year high school diploma. While taking their eleventh- and twelfth-year work, students may work in industry if jobs are available, alternating two weeks on the job and two weeks in school. The school does not claim to turn out journeymen but does claim "to turn out boys with a knowledge of the fundamental skills and processes that gives them a good start in one of the many occupations in the field."

The New York School of Printing is the largest printing school in the United States. Its faculty numbers nearly fifty members and its registration in all departments is fourteen hundred students. The school organized in 1925 offers instruction to pre-apprentices, apprentices, and journeymen in the printing trades and is open for instruction twelve hours daily. The pre-apprentice department accepts junior high school graduates for a four-year full-time course in printing. A few eighth-year graduates are accepted for try-out work in printing to determine their suitability for continuing instruction in these trades. The objective in this department of the school is trade-preparatory. The pre-apprentice school offers courses also to employed minors under the New York State Compulsory



Courtesy of The New York School of Printing

Instruction for apprentices and journeymen in job cylinder and offset presswork, The New York School of Printing.

attendance law for employed minors. The very interesting plan for training apprentices will be discussed in the section on Part-Time Trade Schools for Those Apprenticed *

Enough has been said to show the general nature of this type of printing school. While in some cities the graduates of the schools are given credit on their apprenticeship for their school work when entering employment in closed or union shops, the procedure has not become a general practice. However, with the improvement of school standards, more careful selection of instructors, and better equipment, there is every reason to believe that this practice will be extended. The granting of apprenticeship credit for time spent in school is decided by the local branches of the unions and not by the international organizations. Employment of graduates of printing schools will not be difficult if the number of graduates is limited to the needs of the industry, if the instruction is carefully organized, and if the industry and schools co-operate in training the students.

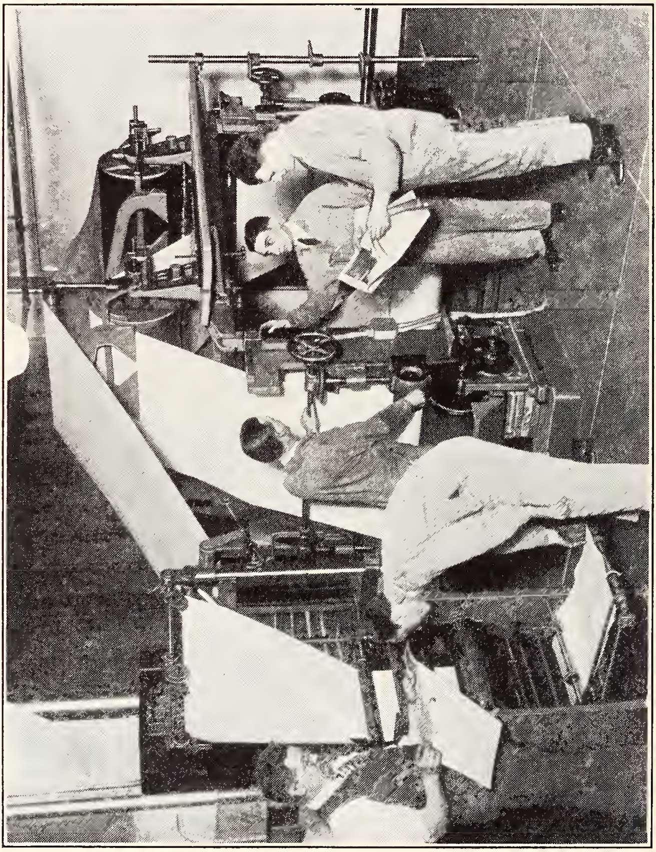
Part-Time Trade Schools for Those Apprenticed

Many persons believe that the one best method of apprentice training is "learning on the job, guided by properly related school experience." They think that the young persons should become apprentices where they learn on the job and at the same time they should go to school where they get the rest of their training. Examples of these part-time schools for boy and girl apprentices are found all over the United States; some, run by individual employers in their own shops; others, provided by groups of employers; still others, by employers and employees co-operating with other organizations in the community, including the Board of Education; and some, by the employees' organizations alone. Courses in these schools vary in length; they are given in the daytime and at night; they are for different parts of the printing trades. In fact almost every variety of school is to be found. All, however, attempt to give what the daily work and

---

*Page 127.

training of the apprentice on the job can not give and can not hope to give no matter how carefully supervised, for the main purpose of a print shop is not to train apprentices after all but to print the orders sent in by the customer.



Courtesy of New York Employing Printers' Association

CLASS IN OPERATION OF ROTOGRAVURE PRESS

School for Newspaper Pressmen, The New York School of Printing, New York City

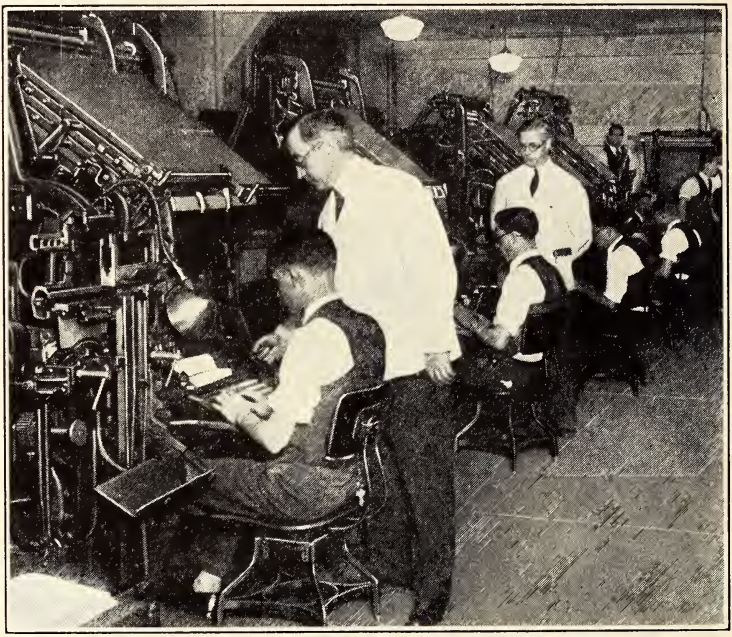
One of the largest employers who has a school of his own in which to train his own apprentices is the United States government, which owns and operates the United States Government Printing Office, Washington, D. C., where the many government pamphlets are printed.[33] The apprentices here are boys who have successfully passed a civil service examination given on a certain day in various cities of the United States. At the time of the examination the applicants must have reached their sixteenth birthday but not their nineteenth, and must have had an education equivalent to the completion of the eighth grade. The boys may be apprenticed as compositors, pressmen, bookbinders, stereotypers, electrotypers, photo-engravers, or machinists. They are given a five-year course, which consists partly of instruction of a practical nature, given by a teacher in a classroom set aside for this use and equipped with various machines, and partly of actual work on the job in the government printing plant itself. At the completion of the five-year apprenticeship, the boys become journeymen in the United States Government Printing Office without further examination.

An example of a school for apprentices supported by a group of employers is that of the Chicago School of Printing and Lithography, operated by the Open Shop Employing Printers' Association. The boys during the pre-apprenticeship period of from two to five months go to school full time. At the end of this period they work in a shop full time, attending the school two evenings a week. Training is given in composition, letter presswork, bindery, offset photography, offset plate making, and offset presswork.

New York furnishes the outstanding example of various organizations co-operating in a plan of training for the printing trades. In 1911 the Hudson Guild, a settlement house in New York City, started a class for boys in the neighborhood in printing in the hopes that some of them might become skilled workmen instead of unskilled laborers. Shortly, the employees' and the employers' organizations became interested and contributed to its support. As a result today the School for Printers' Apprentices has an enrollment of approximately 250 composing room apprentices. The school has recently joined the other apprentice departments as part of the organization of the New York School of Printing* and is directed by a board of directors and the Board of Education working in co-operation. The Board of Directors is made up of representatives from the Printers' League Section of the New York Employing Printers' Association, Typographical Union No. 6, and the Hudson Guild. The apprentices as in the other apprentice schools of the New York School of Printing attend one afternoon a week on the employers' time and one night a week on their own. Training in hand composition, English, economics is given all apprentices. In the fifth year of apprenticeship, the young man may specialize in imposition and stonework, layout and design, machine typesetting (in the School for Machine Typesetting*) and proofreading.

---

*Page 123.



Courtesy of New York Employing Printers' Association

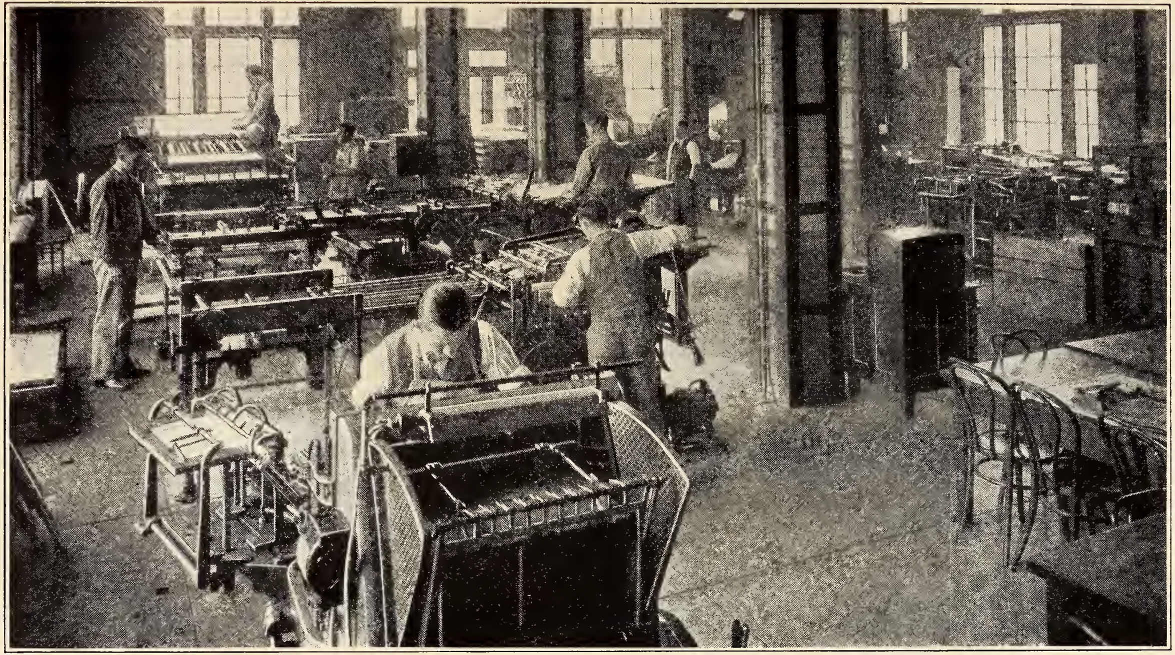
LINOTYPE AND INTERTYPE DEPARTMENT

School for Machine Typesetting, The New York School of Printing, New York City

The other apprentice schools which go to make up the New York School of Printing are likewise managed co-operatively

---

*Page 130.



Courtesy of Carnegie Institute of Technology, Pittsburgh

SECTION OF THE PRESSROOM
Carnegie Institute of Technology, Pittsburgh

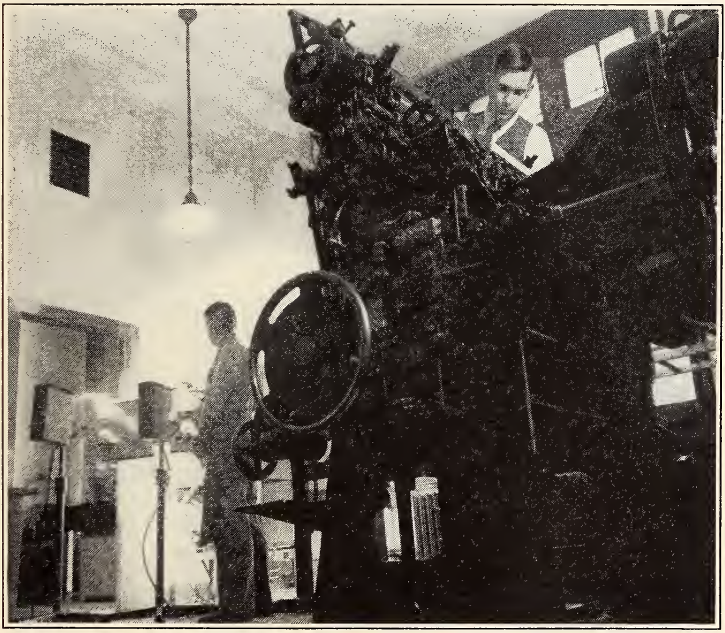
by joint advisory boards representing the employers' organization and the employees' organization working with the Board of Education. These departments of the New York School are:

1. School for Printing Pressmen, managed by
   - Employers' organization—Printers' League Section, New York Employing Printers' Association.
   - Employees' organization—New York Printing Pressmen's Union, No. 51.
   - New York Board of Education.
   - Training on job, job-cylinder, and cylinder presses, photo-offset. Classes in related subjects including inks and color, paper stock, trade practices and techniques, and use of instruments.
2. School for Newspaper Pressmen, managed by
   - Employers' organization—Publishers' Association of New York City.
   - Employees' organization—New York Newspaper Pressmen's Union, No. 2.
   - New York Board of Education.
   - Training in maintenance and operation of newspaper and rotogravure presses, and in technical and other subjects related to newspaper presswork including physics, chemistry, mathematics, and trade practice.
3. School for Machine Typesetting, managed by
   - Employers' organizations—
     - Printers' League Section, New York.
     - Employing Printers' Association.
     - Publishers' Association of New York City.
   - Employees' organization—Typographical Union, No. 6.
   - New York Board of Education.
   - Training in operation and maintenance of linotype and intertype machines.
4. School for Bookbinders Apprentices (in process of organization).

The above schools or departments offer instruction not only to apprentices but also to qualified journeymen. Apprentices attend day and night classes in these schools, usually six hours weekly. By contract, the attendance of apprentices is compulsory.

Another apprentice school not part of the New York School of Printing is the New York School of Photo-Engraving for Apprentice Training, managed by the Photo-Engravers' Board of Trade of New York, New York Photo-Engravers' Union No. 1, and the New York Board of Education. Training is given in art, chemistry, and photography.

So successful has printing instruction in New York City become that the building program for new schools to be erected by the Board of Education includes a building for the New York School of Printing in which will be taught all branches of this major industry in New York. It is estimated that the building aside from equipment will cost approximately $2,500,000.



Courtesy of Carnegie Institute of Technology, Pittsburgh.

Offset press used in photo-lithography course, Carnegie Institute of Technology, Pittsburgh.

Other types of part-time schools, which offer courses, are frequently run by manufacturers of machines. Sometimes also a local union may operate a small school to train apprentices or to keep older men in the trade familiar with the newer developments. Such a school is that managed by the Amalgamated Lithographers of America, Local No. 4, Chicago, which gives a course in the work of the photo-lithographer and of the process artist, newer developments in lithography.

Employers' organizations also, devoted to research and the training of workers for the trade, encourage the establishment of schools, such as for example did the Lithographic Technical Foundation, Inc., which succeeded in establishing evening classes in lithography in connection with the New York Trade School, and which helps with the administration of the classes through its educational director acting as chairman of the Trade School Advisory Committee.

Correspondence lessons are supplied by two employee organizations, mentioned before, the International Printing Pressmen and Assistants' Union of North America and the International Typographical Union, and by one employer organization, the United Typothetae.

Advanced Courses That Train for the Printing Trades

Some boys may have heard about the printing courses at Carnegie Institute of Technology, Pittsburgh, and at New York University; or the newly reorganized one at the Rochester Athenaeum and Mechanics Institute, Rochester, New York. Only young men who have finished a high school course may enter. The classes are planned to train teachers of printing and men who manage printing establishments, that is, executives, whom we have not talked about in this book. A four-year course at Carnegie Institute of Technology offers college training which leads to the degree of Bachelor of Science.

Some Questions to Answer and Problems to Solve

Chapter IX

1. Read carefully through the headings of this chapter and make a list of the different types of schools which train for the printing trades and under each heading write the name of at least one school.

2. Has the number of printing shops in schools increased since 1912? Support your answer.

3. A list of all schools in a local community offering training in the printing trades can be gathered by pooling the information of all members of the class, by referring to the classified telephone directory, by consulting men and women connected with the printing trades. After the list has been prepared, committees of students can visit the school or schools to obtain the answers to the following questions:
    - (a) What organizations or groups of people support the school?
    - (b) What is the purpose of the school?
    - (c) What kinds of training does it give?
    - (d) What are the entrance requirements?
    - (e) How long is the training?
    - (f) How much is the tuition?
    - (g) How many students are generally enrolled?

    The class may decide that it wants to have other information and if so, additional questions can be added to the list. After the visit has been made, a report should be made by the committee to the entire class.

4. A committee from the class may be appointed to write to the nearest office of the United States Civil Service Commission to find out:
    - (a) When the next examination for apprentices for the U. S. Government Printing Office will be given,
    - (b) What the entrance requirements for taking the examination are,
    - (c) And what the nature of the examination will be.

5. Another committee can be appointed to write for catalogues to the Carnegie Institute of Technology and the Rochester Anthenaeum and Mechanics Institute. The sections of the catalogues that refer to the printing trades can be studied and a report made to the class.

To the Boys and Girls Who Have Read This Book

Some boys and girls, who are seriously interested in knowing more about the printing trades, may want to learn about the trades first hand. Besides reading about them from pamphlets and books, and going to interview the head of an employers' organization of an employees' organization to get information, or visiting a printing establishment, they have still another way of getting a close view of part of the industry; that is, by getting a Saturday, after-school, or vacation job in some printing establishment. This, of course, can not always be done, since there may not be an opening. But if one is interested, the thing to do is to put in an application in a school placement office if there is one; or if there is not, to go to the employment office of the printing establishment and put in an application there. If one knows a man in an executive position in a printing establishment, it is well to talk over plans with him and ask him for an introduction to the man or woman who does the hiring.

To work in a printing establishment, one, of course, must observe the Child Labor Law of the state in which he lives. These laws vary from state to state but they all have regulations regarding the age that a young person may begin work, the grade he must have completed, and the employment certificate that must be filed by the employer before work begins. Many states require that the young person be examined by a physician to see that he is physically fit; and some forbid young persons from working on certain dangerous machinery.

There are several kinds of jobs that a young person may work at on Saturdays or during vacations. These are sometimes called pre-apprenticeship jobs but they do not necessarily lead into apprenticeship. Some boys have been very much disappointed when, after they have left school and have worked for several years in a print shop, they are still doing the same kind of unskilled work. If one is anxious to be a real apprentice, he should place his name on the waiting list of apprentices, sometimes kept in the shop by the employer, sometimes held by the apprenticeship committee in the case of union shops.

In these pre-apprenticeship jobs the boy may run errands between various departments, put away slugs, take proof out to the customer to be corrected, call at the customer's shop for the corrected proof, carry material from one department to another. These boys are called errand, floor, or utility boys. In the pressroom when boys take material from the presses, they are sometimes called fly boys.

In binderies, girls may do various light work such as cutting thread off the backs of books; boys usually carry light materials back and forth from the machines.

* * * *

From their first-hand observations, from pamphlets, from government reports, from men in the trades, the boy and girl gather bit by bit a more complete picture of this industry. Thus they grow in knowledge about the work world as a whole. After thinking over some of the facts discovered about the printing industry and the printing trades, we might sum them up as follows:

1. The printing industry is one of the six largest industries in the United States.

2. The shops are scattered all over the United States so that jobs in the printing trades are to be found in all cities and in most small towns.

3. The products of the industry are being used more and more and thus there is a tendency over a period of years to use more workers, although periods of depression set the industry back and labor-saving devices reduce the number of workers needed.

4. There are many new inventions, machinery, and processes, which are developing new trades and divisions of trades within the printing industry.

5. The eight-hour day is practically universal.

6. The men in the printing trades are employed pretty regularly throughout the year; that is, the industry is non-seasonal.

7. Wages for many in the printing trades are at the minimum-of-comfort level.

8. Working conditions are constantly improving, due to the introduction of safety devices, up-to-date methods of ventilation and cleaning.

9. The industry is well organized. This has resulted in fewer strikes and many educational plans for the industry.

10. The best method of training is by apprenticeship, supplemented by school training, relating to the trades.

11. Apprenticeship varies from four to six years in length with the exception of apprenticeship for some jobs in the bindery, which is for one year.

12. Entrance requirements are generally sixteen years of age and eighth grade education. There is a tendency to employ apprentices who have had high school training.

13. The printing trades offer a chance to develop one's knowledge and skill almost indefinitely. Besides, if one has executive ability and in addition some money, openings exist as foremen, executives, and owners.

14. The printing industry serves other businesses. In addition the workers in the printing trades, whether in small towns or in large ones, whether in small quiet workrooms or in large humming establishments, are helping make books, pamphlets, newspapers, which carry ideas to other people. Thus they help to influence our social and political life.

Appendix I

Suggestions for Looking Up References, Especially Those in the Census Volumes

It is not very difficult to look up a reference in a book written by a certain person. We go to the card catalogue in a library, turn to the last name of the author, then the first name, and finally to the particular volume written by the author. The card will show the call number in the left hand corner, which we write down and turn in at the desk for the library attendant to look up on the shelves. When we have the book, we need only turn to the page given in the reference to find the exact wording of the whole text.

To look up tables and other statistical material is a considerably harder task, especially when we go to the original sources, such as the United States census. But we want to learn how to use the various volumes because at some time we shall want to look up facts and figures about our own city. No book the size of the one you are now reading could possibly give the figures for very many of the cities given in the census.

The best short pamphlet which tells about the census is the first one listed in the References under Note 1. You may want to look at this to see what the Census Bureau really does, when the first census was taken, and what later ones there have been.

There are two types of census volumes which we have referred to in this book. We have mentioned certain volumes of the decennial census taken every ten years and of the Biennial Census of Manufactures, taken every two years except in the decennial year when it becomes a part of the decennial census.

To understand just what volumes in the 1930 census are useful in looking up facts and figures about the printing industry and its workers, the contents of each volume are listed below. The volumes which are starred are the ones most useful to us.

REPORTS OF THE FIFTEENTH CENSUS (1930)

Population:
- Vol. I. Number and Distribution of Inhabitants.
- Vol. II. General Report—Statistics by Subjects.
- Vol. III. Reports by States.
  - Pt. 1—Alabama-Missouri.
  - Pt. 2—Montana-Wyoming.
- *Vol. IV. Occupations, by States.
- *Vol. V. General Report on Occupations.
- Vol. VI. Families.

Unemployment:
- Vol. I. Unemployment Returns by Classes for States, Counties, and Cities.
- *Vol. II. General Report on Unemployment.

Agriculture and the Irrigation and Drainage of Agricultural Lands:
- Vol. I. Farm Acreage and Farm Values.
- Vol. II. Reports by States.
  - Pt. 1—The Northern States.
  - Pt. 2—The Southern States.
  - Pt. 3—The Western States.
- Vol. III. Type of Farm.
  - Pt. 1—The Northern States.
  - Pt. 2—The Southern States.
  - Pt. 3—The Western States.
- Vol. IV. General Report—Statistics by Subjects.

Manufactures:
- Vol. I. General Report—Statistics by Subjects.
- *Vol. II. Reports by Industries.
- *Vol. III. Reports by States—Statistics for Industrial Areas, Counties, and Cities.

Mines and Quarries:
- General Report and Reports for States and for Industries.

Distribution:
- Vol. I. Retail Distribution.
  - Pt. 1—Summary for the United States.
  - Pt. 2—Reports by States (Alabama-New Hampshire).
  - Pt. 3—Reports by States (New Jersey-Wyoming).
- Vol. II. Wholesale Distribution.
- Vol. III. Special Trade Reports
  - Pt. 1—Trade Reports on Retail Distribution.
  - Pt. 2—Trade Reports on Wholesale Distribution.
  - Pt. 3—Reports on the Distribution of Agricultural Commodities.

Volumes IV and V of the Population series show not only the occupations of the workers in the United States but also their sex, color or race, and age. Volume IV gives in addition the number of workers of each kind to be found in cities of 25,000 and over. It is in this volume that students will want to look up the number of workers in the printing trades in their particular city or locality.

The second volume in the Unemployment series gives statistics of unemployment by occupation, April 1930, with the returns for the special census of unemployment taken January 1931. In this volume one can find the exact number of men and women unemployed on the dates the censuses were taken in all occupations, including the printing trades, in cities 100,000 and over. Volume II of the Manufactures series has a section devoted to facts about "The Printing, Publishing, and Allied Industries" for the entire country and Volume III lists the printing industries along with other industries and gives the number and size of them in the various states and large cities.

The laws provide not only for the taking of the census every ten years but also for the taking of the Biennial Census of Manufactures as the name indicates every two years. The biennial census gives facts about the size of establishments, the number of workers employed, and the numbers employed each month of the year as well as showing the increase or decrease of each industry. The biennial census has been taken in 1931, 1933, 1935, and 1937. The one taken in 1929 forms a part of the Fifteenth Census.

For boys and girls in high school, the first step is to get the right volume and the right page, and to read accurately from the original sources. This is not always easy to do because the facts and figures are in different positions in the original tables and because the original sources contain much more information than is quoted in the text one is reading. A next step perhaps is to find similar facts for a city or state in which one is interested. Finally in years to come one may be able to recombine these figures and to make new tables which will point out some additional important facts.

REFERENCES

Note 1, p. 3

(a) *The Story of the Census, 1790 to 1916.* U. S. Dept. of Commerce. Bureau of the Census, 1916. 38 p.

Illustrated and readable, of interest to young people.

(b) Holt, William Stult. *The Bureau of the Census: Its History, Activities, and Organization.* Washington: Brookings Institution, 1929. 224 p.

Planned to assist in the administration of public affairs; of greater interest to adults than to young people.

Note 2, p. 3

Biennial Census of Manufactures, 1933. Table 5, "Relative Importance of Leading Industries for the United States," pp. 33-36. U. S. Dept. of Commerce, Bureau of the Census, 1936. 663 p.

Note 3, p. 3

Biennial Census of Manufactures, 1935. "Printing, Publishing, and Allied Industries," pp. 2-39. U. S. Dept. of Commerce, Bureau of the Census, 1937.

Note 4, p. 4

Manufactures, 1929. Vol. I, pp. 62-71. 15th Census, 1930. U. S. Dept. of Commerce, Bureau of the Census.

Note: *The Biennial Census for 1935* does not give the size of establishments.

Note 5, p. 4

Brown, Emily Clark. *Joint Industrial Control in the Book and Job Printing Industry,* p. 4. Bureau of Labor Statistics, Bulletin 481. U. S. Dept. of Labor, 1928.

Note 6, p. 4

The following table combines the figures given by Miss Brown for the years 1919 and 1925 and statistics for 1929 derived from *Manufactures, 1929.* Vol. I, pp. 74-85. 15th Census, 1930. U. S. Dept. of Commerce. Bureau of the Census.

Percentage of Establishments, Wage Earners, Value of Product in Specified Classes of Establishments for the Book and Job Industry, 1919, 1925, 1929.

Class of Establishments—Valuation	Establishments			Wage Earners			Value of Product		
	1919	1925	1929	1919	1925	1929	1919	1925	1929
$5,000 to $20,000	51.2	45.5	47.2	9.8	7.4	8.1	8.1	6.4	6.4
$20,000 to $100,000	35.2	38.9	37.6	26.9	24.1	23.3	23.6	22.2	20.8
$100,000 to $500,000	11.4	13.0	12.6	34.5	33.5	31.7	34.7	33.7	32.3
$500,000 to $1,000,000	1.6	1.6	1.5	14.1	12.8	13.5	15.2	13.5	13.2
$1,000,000 plus	.6	1.0	1.1	14.6	22.2	23.4	18.4	24.1	27.3

Note 7, p. 4

Manufactures, 1929. Vol. III, pp. 30, 70, 72, 152, 159, 237, 258, 272, 295, 364, 408, 410, 453-54. 15th Census, 1930. U. S. Dept. of Commerce, Bureau of the Census.

Note 8, p. 5

(a) *Manufactures, 1919.* Vol. X. "Printing and Publishing," p. 533. 14th Census, 1920. U. S. Dept. of Commerce, Bureau of the Census.

(b) *Manufactures, 1929.* Vol. II. "Reports by Industries," pp. 575-76. 15th Census, 1930. U. S. Dept. of Commerce, Bureau of the Census.

(c) *Biennial Census of Manufactures, 1935.* "Printing, Publishing, and Allied Industries," p. 2.

Note 9, p. 6

Biennial Census of Manufactures, 1935. "Printing, Publishing, and Allied Industries," p. 1.

Note 10, pp. 14, 30, 41, 58, 72

(a) *Population: Number and Distribution of Inhabitants. Vol. I.* 15th Census, 1930. U. S. Dept. of Commerce, Bureau of the Census.

(b) *Population: Occupations by States—Reports by States, Giving Statistics for Cities of 25,000 or more.* Vol. IV. 15th Census, 1930. U. S. Dept. of Commerce, Bureau of the Census.

Note 11, pp. 41, 58, 71

Biennial Census of Manufactures, 1935. "Printing, Publishing, and Allied Industries," pp. 23, 32, 35, 38.

Note 12, pp. 90, 91

Derived from *Population.* Vol. IV, pp. 7-11. 15th Census, 1930.

Note 13, p. 92

(a) *Population: Occupations by States.* Vol. III, Table 20, p. 14. 15th Census, 1930. U. S. Dept. of Commerce, Bureau of the Census.

(b) *Population.* Vol. IV, Table 13, pp. 25-29. 15th Census, 1930.

Note 14, p. 93

Derived from *Population.* Vol. IV, Table 22, pp. 44-63. 15th Census, 1930.

Note 15, p. 93

Population. Occupations. Vol. IV, Tables 7 to 14, pp. 396-439. 14th Census, 1920. U. S. Dept. of Commerce, Bureau of the Census.

Note 16, pp. 94, 95

Hoffman, Frederick Ludwig. *Health Survey of the Printing Trades, 1922 to 1925,* p. 123. Bureau of Labor Statistics. Bulletin 427. U. S. Dept. of Labor, 1927. 149 p.

Note 17, p. 94

(a) Hoffman, Frederick Ludwig. "Mortality Experience of International Typographical Union, 1932." *Monthly Labor Review,* Vol. 36 (June 1933), pp. 1248-52.

(b) "Mortality Statistics of American and English Printers, 1901 to 1935." *Monthly Labor Review,* Vol. 43 (July 1936), pp. 64-66.

(c) Editorial in *Inland Printer,* Vol. 98 (February, 1937), p. 56.

Note 18, p. 97

Herrick, George. "Better Light, Better Work." *American Printer,* Vol. 106 (March 1938), pp. 20-23.

Note 19, p. 97 6

Peterson, Florence and Rauth, C. F. *Union Scale of Wages and Hours in the Printing Trades,* May 15, 1936, pp. 15-16. Bureau of Labor Statistics. Bulletin 631. U. S. Dept. of Labor, 1937. 43 p.

Note 20, p. 97

Manufactures, 1919. Vol. X, "Printing and Publishing," p. 566. 14th Census, 1920.

Note 21, p. 97

Derived from figures given in *Manufactures,* 1929, Vol. I, p. 51. 15th Census, 1930.

Note 22, p. 98

Biennial Census of Manufactures, 1935, "Printing, Publishing, and Allied Industries," pp. 9, 11.

Note 23, p. 98

Unemployment, 1930. Vol. I. Tables 21, 22, pp. 53-55. 15th Census, 1930. U. S. Dept. of Commerce, Bureau of the Census.

Note 24, p. 99

Peterson, Florence and Rauth, C. F. *Union Scale of Wages and Hours in the Printing Trades,* May 15, 1936, pp. 25-44.

Note 25, p. 101

"Wage Scales in Book and Job Shops in Printing Industry, October 20, 1927." Compiled by the Research Library, United Typothetae of America, Washington, D. C. Mimeographed.

Note: Weekly scales only were given in the original statistics with the number of hours worked per week. The hourly scale was determined by dividing the given weekly scale by the given weekly hours.

Note 26, p. 102

Senturia, Joseph J. and McElroy, Frank S. "Union Scale of Wages and Hours in Printing Trades, May 15, 1937." *Monthly Labor Review,* Vol. 45, No. 6 (December 1937), p. 1522.

Note 27, p. 104

(a) *Beneficial Activities of American Trade-Unions,* pp. 70-71. Bureau of Labor Statistics. Bulletin 465. U. S. Dept. of Labor, 1928. 229 p.

(b) Stewart, Estelle M. *Handbook of American Trade Unions.* 1936 Edition. Bureau of Labor Statistics, Bulletin 618. U. S. Dept. of Labor.

Note 28, p. 106

Figures for 1920 are from *American Labor Year Book, 1932,* pp. 30-31. New York: Rand School Press, 7 E. 15th St.

Figures for 1928, 1932, 1936 are from *Proceedings of 56th Annual Convention of the American Federation of Labor, 1936,* pp. 44-45.

Note 29, p. 107

Two pamphlets were printed:

Hoffman, Frederick Ludwig. *Health Survey of the Printing Trade, 1922 to 1925.* Bureau of Labor Statistics. Bulletin 427. U. S. Dept. of Labor, 1927. 149 p.

Kjaer, Swen. *Survey of Hygienic Conditions in the Printing Trades.* Bureau of Labor Statistics. Bulletin 392. U. S. Dept. of Labor, 1925. 229 p.

Note 30, p. 110

"Looking Ahead by Way of Apprenticeship." A pamphlet, published by the Federal Committee on Apprenticeship Training, U. S. Dept. of Labor, 1937.

Note 31, p. 113

Shop Rules and Wage Scales: Contract for Book and Job Offices Between Printers' League Section, New York Employing Printers' Association, Inc. and Typographical Union, No. 6, 1936-1938, pp. 26-27.

Note 32, p. 115

Shop Rules and Wage Scales, 1936-38, p. 30.

Note 33, p. 126

Prospectus of the Apprentice School, United States Government Printing Office, Washington, D. C. Washington, D. C.: Supt. of Documents, 1937. 53 p.

Appendix II

Employers' Organizations

American Newspaper Publishers' Association. 370 Lexington Ave., New York, N. Y.

American Photo-Engravers' Association. 175 W. Jackson Blvd., Chicago, Illinois.

Bookbinders' Trade Association. 175 Fifth Ave., New York, N. Y.

Employing Bookbinders of America. 28 W. 44th St., New York, N. Y.

Employing Photo-Engravers' Association. 223 W. Jackson Blvd., Chicago, Illinois.

Employing Printers of America. 53 W. Jackson Blvd., Chicago, Illinois.

Graphic Arts Board of Trade. 291 Broadway, New York, N. Y.

Graphic Arts Finishing Association. 500 S. Peoria St., Chicago, Illinois.

International Association of Electrotypers and Stereotypers. 950 Leader Bldg., Cleveland, Ohio.

Lithographers' National Association. 295 Madison Ave., New York, N. Y.

Lithographic Allied Trade Service Association. 110 E. 42nd St., New York, N. Y.

Lithographic Technical Foundation, Inc. 220 E. 42nd St., New York, N. Y.

National Association of Employing Lithographers. 295 Madison Ave., New York, N. Y.

National Association of Photo-Lithographers. 1776 Broadway, New York, N. Y.

National Graphic Arts Education Guild. 719 Fifteenth St., N. W., Washington, D. C.

National Gravure Printers Association. 4601 Belmont Ave., Chicago, Illinois.

Photo-Engravers Copper and Zinc Grinders' Association, care of Roy Manny, 214 Van Brunt St., Brooklyn, N. Y.

United Typothetae of America. 719 Fifteenth St., N. W., Washington, D. C.

Employees' Organizations

Amalgamated Lithographers of America. 205 W. 14th St., New York, N. Y.

International Allied Printing Trades' Association. 2820 N. Meridian St., Indianapolis, Indiana.

International Brotherhood of Bookbinders. Room 308, American Federation of Labor Bldg., Washington, D. C.

International Photo-Engravers' Union of North America. Tower Grove Bank Bldg., 3138 South Grand Blvd., St. Louis, Missouri.

International Plate Printers, Die Stampers and Engravers' Union of North America. Washington Loan and Trust Bldg., Washington, D. C.

International Printing Pressmen's and Assistants' Union of North America. Pressmen's Home, Tenn.

International Stereotypers' and Electroypers' Union of North America. 2645 W. 28th St., Kansas City, Mo.

International Typographical Union. 2820 N. Meridian St., Indianapolis, Indiana.

Appendix III

Questionnaire for Investigating System of Apprenticeship When Visiting a Print Shop

1. Name of print shop. Address.
2. Is the shop union or nonunion?
3. Name of person interviewed. Title.
4. Total number of persons employed directly in or in connection with the printing trades.
5. Who hires the apprentice?
6. How much education must he have? 7. What age must he be?
8. Is a physical examination required? If so, who gives it?
9. Are there any other requirements?
10. How many apprentices are there? No. of boys. No. of girls.
11. In what printing trades are they apprenticed?
12. State number of apprentices in each printing trade.
13. State in which trades girls are apprenticed.
14. Is there a probationary period after the apprentice has started work? If so, for how many months?
15. How many years does the apprentice have to serve before he becomes a journeyman? (List each of the printing trades separately.)
16. Does the apprentice sign an agreement with the employer? (Get a sample copy if possible.)
17. How many hours does the apprentice work each day? How many each week?
18. What wages does he start with? How is he increased? (Give the entire scale during the apprenticeship period, if possible.)

Training

19. Who supervises the apprentices?
20. What job is the apprentice put on first?
21. Describe, if possible, the order in which the apprentice learns the various parts of the trade.
22. Is any regular school work given in the shop during working hours?
23. Is any outside training required either in a special school outside working hours or through a correspondence course?
24. Is the apprentice given an examination during or at the end of the period of apprenticeship?
25. Is there any graduation exercise when he finishes the apprenticeship period and becomes a journeyman?
26. Is the apprentice ever laid off because of slack times?
27. What arrangements are made for taking him back and in making up his lost time?

Name of student making investigation

Date of investigation

Questionnaire to be Used When Interviewing a Union Official About Apprenticeship and in Reading Over the Apprenticeship Agreement for One of the Printing Trades

1. Name of union.
2. Address of union.
3. Name of official interviewed. Title.
4. What branches of the printing trades does this union regulate?
5. Has the union an agreement with the employers as to wages and hours?
6. Has the union an agreement with the employers as to apprenticeship? (Get printed copy of the agreement if possible.)
7. What is the name of the employers' organization with which the union makes the agreement?
8. How many shops does the agreement cover? (List shops or get printed list of these shops if possible.)
9. Is there an apprenticeship committee?
10. How is the committee formed? (Are there employers and employes on the committee or employees alone?)

    Name of secretary or some other member of the committee.
11. How many apprentices are there in the city for this branch of the printing trades and under this plan?
    How many boys? How many girls?
12. Who selects the apprentice?
13. How much education is required?
14. How old must the apprentice be?
15. Must he have a physical examination? Who gives it?
16. Are there any other requirements?
17. Does the apprentice sign the agreement?
18. Is there a probationary period? For how long?
19. For how many years must the apprentice serve?
20. Does the agreement specify what the apprentice shall do each year? (If so, give in detail.)
21. Does the apprenticeship committee supervise the apprentices in any way? How?
22. Is any additional training required in a special school or through correspondence?
23. What are the regulations regarding the scale of wages? (Give in detail.)
24. What are the regulations regarding hours?
25. Is there any regulation regarding the apprentice changing his employer?
26. Does the union have any ceremony when the apprentice becomes a journeyman?
27. What are the fees of the union for the apprentice? For the journeyman?
28. Describe any other part of the agreement that you found interesting.

Name of student making investigation
Date

Appendix IV

Bibliography

Note: Most of the books listed here are for older students or adults. However, most younger students will be able to use them for reference if not for general reading.

Baker, Mrs. Elizabeth Faulkner. *Displacement of Men by Machines.* New York: Columbia University Press, 1933.

A study of what took place in 53 pressrooms in book and job establishments in New York City when automatic feeders were introduced.

Davenport, Cyril. *The Book: Its History and Development.* London: Archibald Constable, 1907.

Contains chapters on early records, rolls, paper, illustrations, leather, ornamentation of leather bindings.

Franklin, Benjamin. *Autobiography,* illustrated by Kleber Hall. Riverside Bookshelf. New York: Houghton Mifflin Co., 1923.

Groesbeck, Harry A. *Practical Photo-Engraving.* New York: Harper and Brothers, 1930.

Written in the form of fifty letters from a photo-engraver to his son, apprenticed in the trade. Discusses in informal fashion all phases of photo-engraving including presswork.

Gustafson, David. *The Importance of the Printing Industry: Printing Firms and Plants.* Pittsburgh: Carnegie Institute of Technology, 1931.

A pamphlet of 65 pages, prepared primarily for use in classes of the Department of Printing, Carnegie Institute of Technology.

Hamilton, Frederick W. *A Brief History of Printing in America.* Washington: United Typothetae of America, Committee on Education, 1918.

A brief history (89 pages) planned for apprentices.

Hamilton, Milton W. *The Country Printer, New York State, 1785-1830.* New York: Columbia University Press, 1936.

"A composite portrait of the country printer and an estimate of the influence of the country press" from 1785 when the first country newspaper was established at Poughkeepsie, during the next twenty-five years which brought a remarkable development. Although a research study, parts are readable enough for older high school students and apprentices.

Harper, Joseph Henry. *The House of Harper: A Century of Publishing in Franklin Square.* New York: Harper and Brothers, 1916.

Haynes, Merritt. *The Student's History of Printing.* New York: McGraw-Hill Book Co., 1930.

Hoffman, Frederick Ludwig. *Health Survey of the Printing Trades, 1922 to 1925.* U. S. Dept. of Labor, Bureau of Labor Statistics, Bulletin 427. Washington: U. S. Government Printing Office, 1927.

Based upon questionnaires sent to employing printers throughout the United States and Canada, questionnaires sent to secretaries of the locals of all the international unions, and upon inspections made by the United States Bureau of Labor Statistics.

Ilin, M. *Black on White.* Translated from the Russian by Beatrice Kincead. Philadelphia: J. B. Lippincott Co., 1932.

"The story of books," simply written for children, but of interest to older young people and adults. Numerous, interesting illustrations by N. Lapshin.

Kjaer, Swen. *Survey of Hygienic Conditions in the Printing Trades.* U. S. Dept. of Labor, Bureau of Labor Statistics, Bulletin 392. Washington: U. S. Government Printing Office, 1925.

Based upon personal inspection of 1000 representative plants, located in 21 cities in the United States. Includes a number of rather detailed job descriptions.

Lane, May Rogers. *Vocations in Industry, Vol. III: Manufacturing and Mechanical Industries.* Scranton, Pa.: International Textbook Co., 1932.

A book prepared for guidance workers. Section IX (pp. 385-422) discusses the printing and publishing industries.

McMurtrie, Douglas Crawford. *The Book.* New York: Covici-Friede, 1937.

"The Story of Printing and Bookmaking," starting with primitive man and continuing to the present day. Contains a vast amount of information and full bibliography, pp. 603-646.

McMurtrie, Douglas Crawford. *A History of Printing in the United States, Vol. 2.* New York: Bowker, 1936.

Volume 2 on the Middle and South Atlantic States, only has appeared of this proposed four-volume work, which aims to tell the story of the introduction of the press, its history and influence during the pioneer period in every state of the union.

National Resources Committee. *Technological Trends and National Policy.* Washington: U. S. Government Printing Office, 1937.

Pages 224-248 discuss the latest inventions in printing and photography and their social implications.

Oswald, John Clyde. *A History of Printing: Its Development Through Five Hundred Years.* New York: Appleton-Century Co., 1928.

Includes discussions of early printing and printers such as Gutenberg, in Cologne, Italy, France, the Low Countries, America, Canada, Greenland, Alaska. Of use for reference work.

Oswald, John Clyde. *Printing in the Americas.* New York: The Gregg Publishing Co., 1937.

Discusses: What printing brought to the New World; The first newspaper: First American printing of the Bible: Other publishing ventures; Equipment of the colonial printshops. Contains short biographies of printers and information about firms and establishments in the various states of the United States and countries of South America. Of special use for reference.

Polk, Ralph W. *The Practice of Printing.* Peoria, Ill.: The Manual Arts Press, Rev. Ed., 1937.

A textbook for teachers and students of printing. The new edition has a chapter on Photo-Offset-Lithography.

Magazines

American Photo-Engraver
Official organ of the International Photo-Engravers' Union of North
American Printer
9 E. 38th St., New York, N. Y.
America. 3138 S. Grand Blvd., St. Louis, Missouri.

Graphic Arts Education
Published by the American Institute of Graphic Arts, Division of Education, 125 E. 46th St., New York, N. Y.

Inland Printer
205 W. Wacker Drive, Chicago, Illinois.

International Bookbinder
Official organ of the International Brotherhood of Bookbinders, American Federation of Labor Bldg., Washington, D. C.

Lithographers Journal
Official organ of the Amalgamated Lithographers of North America, 205 W. 14th St., New York, N. Y.

Typographical Journal
Official organ of the International Typographical Union, 2820 N. Meridian St., Indianapolis, Indiana.

INDEX

A

Adams, J. A., 60.
Agreements, 106, 113-14.
American Newspaper Publishers' Association, 103.
Apprentices, 93, 109-15.
Apprenticeship, 106-07, 109-15, 136.

B

Back room, 63.
Backer, 47
Baltimore, Md., Ottmar Mergenthaler School of Printing, 120-21, 123.
Bankman, 19.
Batteryman, 65-66.
Ben Day artist, 77.
Bindery department, 37-39, 41-43.
Bindery workers, numbers of, 40-41; qualifications of, 54.
Black leader boy, 66.
Blocker, electrotyping department, 68.
Bookbinders, *see* Bindery workers.
Boston, Mass, Wentworth Institute, 120-21.
Branches of the printing inudstry, 6.
Buffalo, N. Y., Burgard Vocational High School, 120.
Builder, 65.
Burgard Vocational High School, Buffalo, N. Y., 120.

C

Carnegie Institute of Technology, Pittsburgh, Pa., 132.
Case, The, 15.
Case-maker, 50.
Caser-in, 50.
Cass Technical High School of Detroit, Mich., 120.
Caster, electrotyping department, 66; stereotyping department, 61-62.
Census, The, 3, 137-39.
Centers of industry, *see* Printing industry, centers of.
Central Trade School of Oakland, Calif., 120.
Chicago School of Printing and Lithography, 127.
Child Labor Law, 134.
Cincinnati, Ohio, Printing Vocational High School, 120, 123.
Cleaner, 53.
Collator, 46.
Collective bargaining, 106.
Color blindness, 35, 81.
Composing room, 11, 13.
Composing stick, 16.
Compositors, 15-16; number of, 14; qualifications of, 21-22.
Copy, 16.
Copy cutter, 15.
Copyholder, 19-20.
Copyman, 15.
Coster of Haarlem, 13.
Counter, 53.
Crayon artist, 84.
Crayon lithographer, *see* Crayon artist.
Cylinder depositor, 80-81.
Cylinder grinder, 80-81.
Cylinder press, 24, 32.

D

Dangers and hazards, 11, 13, 26, 39, 60, 72, 81, 94-97.
David Hale Fanning Trade School for Girls, Worcester, Mass., 120.
Delgado Trades School of New Orleans, La., 120.
Departments of a printing establishment, 7.
Designer, *see* Layout man.
Detroit, Mich., Cass Technical High School, 120.
Division of labor, 7-8, 136.
Doctor blade, *see* Ductor blade.
Dragon's blood, 78.
Ductor blade, 32, 80.
Dunwoody Industrial Institute of Minneapolis, 120.

E

Electrotype, 56-57.
Electrotypers, number of, 58; qualifications of, 68-69.
Electrotyping department, 24, 56-57, 60.
Embosser, 51.
Employees' organizations, 104-06, 110, 144-45.
Employers' organizations, 103, 110, 144.
Engraver, 80.
Entrance requirements, 112-13, 136.
Etcher, 78, 80.

F

Federal Committee on Apprentice Training, 110.
Finisher, electrotyping department, 67; photo-engraving department, 79; rotogravure photo-engraving department, 80.
Finishing process, bindery department, 47, 50.
Finishing room, electrotyping department, *see* Front room.
Flat-bed cylinder press, 32.
Flong maker, 61.
Fly boy, 93, 135.
Folder, 45-46.
Forwarding processes, 47, 50.
Frank Wiggins Trade School of Los Angeles, Calif., 120.
Front room, 63, 67.
Fumers, 13, 60, 72, 81, 94-95.

G

Galley, 16-17.
Gatherer, 46.
Ged, William, 60.
Gold layer, 51.
Gold-leaf gilder, 47.
Graduation of apprentice, 115.
Gravers, 80.
Gutenberg, Johann, 14, 26, 28.

H

Hand compositor, *see* Compositor.
Hand transfer press, 85.
Hand transferrer, 85.
Hard binding, 39.
Hazards, *see* Dangers and hazards.
Head bands, 47.
Hours of work, 97, 114-15, 136.

I

Indexer, 51.
Intaglio process, 80.
International Allied Printing Trades Association, 104-05.
International Joint Conference Council, 107.
International Printing Pressmen and Assistants' Union, 104, 114, 132.
International Typographical Union, 104, 106, 112, 114, 132.
Inventions, 2, 7, 13-14, 26, 28-30, 39-40, 42, 58, 60, 70-71, 136.

J

Jacobi, Professor, 60.
Jogging machine, 53.
Jordan, C. J., 60.
Junior workers, 93, 134-35.

L

Laborers, printing industry, 41.
Layout man, 14-15.
Lead poisoning, 94-95.
Length of apprenticeship, 113-14.
Letter artist, 83.
Life earnings, 102.
Lighting, 95-97.
Liner-up, 47.
Linotype machine, 11, 13-14.
Linotype operator, 17-18.
Linotypers, 14.
Lithograph, 71.
Lithographers, number of, 71-72; qualifications of, 87-88.
Lithographic color-artist retoucher, 83.
Lithographic Technical Foundation, Inc., 132.
Lithographing department, 24, 72.
Los Angeles, Calif., Frank Wiggins Trade School, 120.

M

Machine tender, 19.
Magazine, The, 17.
Mailer, 51, 53.
Mailing department, 37.
"Make ready," 34.
Make-up man, 20.
Marbler, 50.
Mat roller, 61.
Miller Vocational High School of Minneapolis, Minn., 120.
Minneapolis, Minn., Dunwoody Industrial Institute, 120; Miller Vocational High School, 120.
Molder, 64-65.
Molding room, *see* Back room.
Monotype caster operator, 18-19.
Monotype keyboard operator, 18.
Monotype machine, 11, 13-14.

N

National Recovery Administration, 106.
National Graphic Arts Education Guild, 119.
Nationality of workers, 92-93.
Negroes, 92-93.
New Orleans, La., Delgado Trades School, 120.

New York School of Photo-Engraving for Apprentice Training, 130.
New York School of Printing, 119-20, 123, 125, 127-28, 130-31.
New York Trade School, 132.
New York University, 132.
Nonunion shops, 100-03, 109-10.
Number of workers, *see* Printing trades, number of workers.
Numbering machines, 53.

O

Oakland, Calif. Central Trade School, 120.
Occupational disease, *see* Dangers and hazards.
Offset press, 32, 71, 86-87.
Offset pressmen, qualifications of, 87-88.
One-man shops, 3, 4, 11, 26, 39.
Open-shops, 100-03, 109-10.
Operatives, printing industry, 41.
Operator, *see* Photographer.
Organization in the printing industry, 103-07, 136.
Ottmar Mergenthaler School of Printing, Baltimore, Md., 120-21, 123.

P

Paging machine, 53.
Paper-cutting machine, 53.
Paper ruling, 39.
Paster, 46.
"Patent" insides, 57-58.
Perforating machine, 53.
Photo-composing machine, 84.
Photo-engravers, number of, 71-72; qualifications of, 81-82.
Photo-engraving, 71.
Photo-engraving department, 24, 71-72.
Photographer, 75-76, 80.
Photo-lithographer, 83.
Pittsburgh, Pa., Carnegie Institute of Technology, 132.
Plate grainer, *see* Plate preparer.
Plate preparer, 83.
Platen press, 32.
Press feeder, 31, 35.
Press plate maker, 84.
Presser, 47.
Presses, 28-30, 32.
Pressman's assistant, 31-32, 35-36.
Pressmen, 31, 33-36, 86-88; number of, 30-31; qualifications of, 35-36, 87-88.
Pressroom, 24-26.
Printer, The, 8; photo-engraving department, 76-77.
Printing establishments, departments of, 7; number of, 3, 5; size of, 3-4, 8.
Printing industry, branches of, 6; centers of, 3-5, 135; future of, 6; growth and change in, 5-6, 135; importance of, 1-3, 135-36; number of workers, 3, 5-6, 89-91; size of, 2-3; value of product, 4-6.
Printing press, *see* Presses *and also specific kinds of presses, such as,* Offset press, Platen press, Cylinder flatbed press, Rotary press, Web-rotary press.
Printing trades, history of, 7, 13-14, 26, 28-30, 39-40, 58, 60, 70-71; nationality of workers, 92-93; number of workers, 89-91.
Printing Vocational High School of Cincinnati, 120, 123.
Process, artist, *see* Lithographic color-artist retoucher.
Proofer, 80, 86.
Proofreader, 19-21.
Proofreader's marks, 19-20.
Prover, *see* Proofer.

Q

Quades, 16.
Qualifications, compositors, 21-22; pressmen, 35-36; bindery workers, 54; stereotypers and electrotypers, 68-69; photo-engravers, 81-82; lithographers and offset pressman, 87-88.

R

Race of workers, 92-93.
Regularity of employment, 97-98, 136.
Retoucher, 80.
Rochester Athenaeum and Mechanics Institute, 132.
Rotary press, 32.
Rotogravure, 71.
Rotogravure photo-engraving, 80.
Rotogravure press, 32.
Rounder, 47.
Router, electrotyping department, 67-68.
Router-blocker, photo-engraving department, 78-79.
Ruler, 53.

S

Schools, 118-32; New York School of Printing, 119-20, 123, 125, 127-28, 130-31; Frank Wiggins Trade School of Los Angeles, Calif., 120; Wentworth Institute of Boston, 120-21; Dunwoody Industrial Institute of

Schools—Continued.
  Minneapolis, 120; Delgado Trades School of New Orleans, 120; Cass Technical High School of Detroit, 120; Printing Vocational High School of Cincinnati, 120, 123; Ottmar Mergenthaler School of Printing, Baltimore, 120-21, 123; Burgard Vocational High School, Buffalo, 120; Central Trade School of Oakland, Calif., 120; South Bend Vocational School, South Bend, Ind., 120; Miller Vocational High School, Minneapolis, 120; David Hale Fanning Trade School for Girls, Worcester, Mass., 120; Chicago School of Printing and Lithography, 127; New York School of Photo-engraving for Apprentice Training, 130; New York Trade School, 132; Carnegie Institute of Technology, 132; Rochester Athenaeum and Mechanics Institute, 132.
Scroll, 39.
Seasons, *see* Regularity of employment.
Senefelder, Alois, 70-71.
Signatures, 45-46.
Sizing, 47, 50-51.
Slug, 18.
Smasher, 47.
Soft binding, 39.
South Bend Vocational School, South Bend, Ind., 120.
Spencer, Thomas, 60.
Stamper, 50-51.
Standard of living, 99, 102.
Steam table man, 61.
Step-and-repeat machine, 84.
Stereotype, 56-57.
Stereotypers, number of, 58; qualifications of, 68-69.
Stereotyping department, 24, 56-57, 60.
Stick, *see* Composing stick.
Stitcher, 46.
Stone engraver, 84-85.
Stone preparer, *see* Plate preparer.
Stoneman, 20.
Stripper, 76.

T

Table work, 45.
Teletypesetter, 14.
Teletypesetter operator, 19.
Temporary work, 97-99.
Tests for measuring qualifications of workers, 22, 35-36, 54, 68-69, 82, 88, 112-13, 123.
Tint layer, *see* Ben Day artist.
Tipper, 46.
Training, 106-07, 114, 118-32, 136.
Transferrer, see Press plate maker.
Transferring room, 72.
Trimmer, bindery department, 47; stereotyping department, 62.
Tuberculosis, 94-95.
Typesetter, 14.

U

Unemployment, 97-99.
Unemployment insurance, 99.
Union shops, 103, 109-11.
United States Government Printing Office, 126-27.
United Typothetae of America, 99, 101, 103, 106, 119, 132.

V

Vellum, 39.

W

Wages, 99-102, 114-15, 136.
Wax caster, 63.
Web-rotary press, 32, 62.
Wentworth Institute of Boston, 120-21.
Women workers, 14, 19, 30-31, 43, 45, 58, 71-72, 91-92.
Worcester, Mass, David Hale Fanning School for Girls, 120.
Working conditions, 94-101, 136.

Date Due

[illegible] '40	16 Dec '40		
JUL 5 '51	JUL 7 '51		

655
C592p

The printing trades and their main
655C592p
3 1262 03158 0359